

Australian Model Engineering

January-February 2002

Issue 100

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☒ A Model CL Class Diesel Electric Loco
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Australian Model Engineering

ISSN-0819-4734

Publisher: Australian Model Engineering Pty Ltd.

ACN 008 627 825

Australian Model Engineering is published six times per year at two-monthly intervals. January is the first issue for the year.

Subscriptions

An annual subscription to AME costs just \$38.00 (incl. GST) within Australia. NZ is AUD\$47; all other countries, AUD\$58 air. You can pay by cheque, money order, or overseas bank draft. You can also use your Bankcard, MasterCard or VISA credit card. **All Mail to:**

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Printing and Distribution

Proudly printed in Australia for the publisher by Pirie Printers Pty Ltd, 140 Gladstone Street, Fyshwick ACT 2609

Australia Post Print Post Approved.

Publication No. **PP228582/00001**

Distribution is by subscription, through hobby supply houses and related-interest sales outlets worldwide, and also by Gordon and Gotch Limited through newsagents in Australia.

North American agent:

**Wise Owl Worldwide Publications
1926 S. Pacific Coast Highway, Suite 204
Redondo Beach, CA 90277
Telephone: 310-944-5033**

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Issue 100

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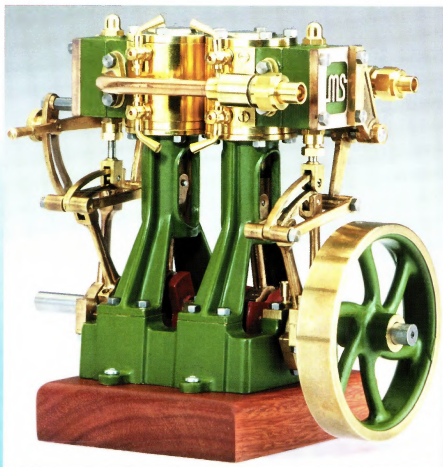
Front cover

This outstanding model Foden Type "C" steam wagon and trailer was built several years ago by Brian Niesche and was on static display at the recent Miniature Traction Engine Rally (see page 17) after several years on display in a museum. It has now gone to a new home in Newcastle where it steams again.

Photo: David Proctor

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Contact the Managing Editor

Comment

A model engineering achievement

You have in your hands a significant milestone in model engineering, especially for Australia and New Zealand. I am referring, of course, to the fact that this is the 100th issue of the *Australian Model Engineering* magazine.

When one thinks back to the early days and to the detractors who thought that the magazine was a 'flash in the pan' and would never really work, it has to be with gratitude that one also recalls the visionaries who refused to listen to them because (a) they knew that there was a need to be met and (b) they had every confidence that this magazine was the way to meet that need. One hundred issues later they have been proved right.

The strength of the magazine lies in the strength of the hobby and there is no doubt that model engineering is really alive and well 'down under'. Conversely, I believe it is reasonable to assume that the strength of the magazine has contributed to the strength of the hobby. At the present time there are some 75 clubs in Australia and another 25 in New Zealand, and although miniature railways dominate throughout, there are also clubs which specialize in other aspects of model engineering and clubs which have a wide cross-section of modelling disciplines within. That is a thriving hobby!

Sales of *Australian Model Engineering* are at a record high and continue to grow at a steady rate within Australia and New Zealand as well as the U.S.A. and Canada. In fact we now have regular readers in 27 countries. Some people periodically express concern about the aging population of model engineers — maybe not. I can't speak for the clubs but I do know that a significant number of our newer subscribers are younger people who are just starting out in model engineering. A very brief account of the history of AME appears on page 34 and when you read it perhaps you, like me, will agree that for a magazine which has relied almost exclusively on volunteer input throughout, we have come a long way.

To mark this milestone edition as something special, we have splashed out and gone for colour throughout. For now this has to be a one-off as the extra cost involved is quite significant but we will continue to have some colour in each issue in the way we have over the past few years. As to content, the *Bunyip* series will wind up with the next issue and we have some different, but very interesting shorter series to follow. Articles on topics such as making injectors, building a versatile loco test stand and constructing some outstanding articulated passenger cars are just a few to whet the appetite.

I wonder how our hobby will look in a little over 16 years time when issue 200 comes out (with someone else in the Editor's chair!). In these days of increasing regulation, particularly for the railways, will we see a gradual decline in public tracks and a resurgence of private ones? Will steam continue its popularity or will tastes change more to models of modern prototypes. Regardless of how things change or how serious things may at times appear, never lose sight of the fact that it is a hobby after all — and hobbies are for fun!

David Proctor

Join us in a great hobby!

If this is your first issue of *Australian Model Engineering*, welcome!

In successive issues we cover many topics centred on that wonderful process of model engineering — alias *tinkering*.

If you're new to model engineering as well as to our magazine, you'll benefit from getting together with other model engineers — we're good at sharing ideas and saving each other money! If you don't have any contacts, start by looking in *Club Round-up* to find a club that's near to you. Many of our readers have discovered people with similar interests literally just around the corner.

Helping other model engineers is the simple idea of the volunteers behind this magazine. Our readers write items for us — for the same (non-existent) rate of pay! If you have ideas, opinions or techniques that you feel would be interesting to others (especially from the newcomer's angle), please drop us a line. We can send you a useful guide and help with preparing artwork or editing.

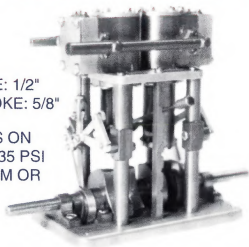
I hope you'll enjoy the great fellowship that makes our hobby special, and that you'll support our advertisers — after all, they help pay our bills!

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Managing Editor



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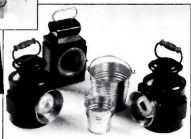
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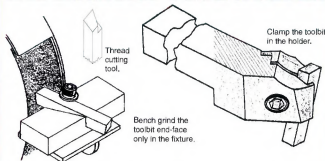
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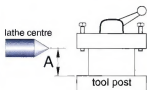


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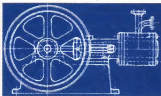


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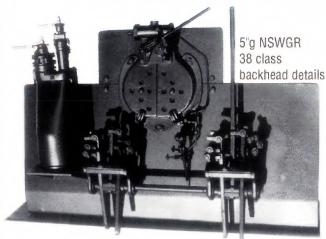
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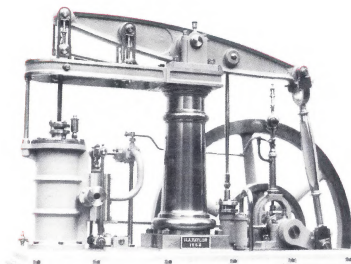
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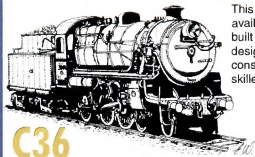


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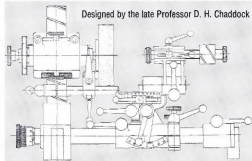
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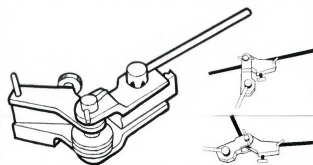


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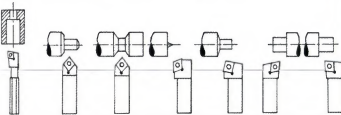
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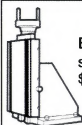
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THE TESLA DISC TURBINE

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The Croatian born inventor Nikola Tesla is best known today for the Tesla Coil and for sitting under a gigantic version of one as it spewed high voltage lightning around him, but on a more sensible level he invented the AC electrical system almost universally used today. He may also have been the first to invent wireless and have worked out the principle of laser beams during World War II. One of his inventions, which he patented, is the subject of this book and had nothing to do with electricity, other than as a possible means of generating it.

His Disc Turbine was granted a British Patent in 1910, which also covered a compressor variant. Unlike a conventional turbine, in which the rotor consists of bladed segments, in Tesla's machine these were replaced by discs, working on the concept of flowing media being converted to rotary motion by friction working on the discs. Tesla claimed that a very small, but extremely powerful machine was possible using this principle - in fact his aim was to produce a 25 hp machine that would fit inside a bowler hat.

A number of experimental machines were built, the largest producing 500 kw, all using steam as the media, and as single machines without condensers. Whilst they all worked well they were ahead of the metallurgy of the time, as the very high centrifugal forces caused the discs to stretch and this, coupled with lack of funds prevented further development, the *Parsons* and *Curtis* types of turbine reigning supreme up till the present day with Tesla's type being largely forgotten.

Intrigued by references he came across to Tesla's ideas, John Cairns started investigating and this book is the result. In it he describes the concept, and the history, of the original engines. He then proposes a number of uses for such turbines, including car and light aircraft use, all of which illustrate the extraordinary versatility of Tesla's engine. Finally he provides the design and building instructions for a small Tesla turbine which any model engineer should be able to build.

Not only does a Tesla Turbine provide a very high power to size ratio, it can be used as a compressor or pump, as well as a prime mover. Tesla used steam on his test machines, and the model featured here would probably be run on compressed air, but the gas turbine principle can also be used; this really is a versatile machine.

This versatility means that ninety one years after the original Patents were granted there are signs of re-awakened interest in Tesla's machine, as many of the original problems can be overcome with modern materials. What is exciting is that, rather than with the revival of the Stirling Cycle engine, this revival can be materially boosted by individual experimenters.

This book is the place to start! High quality. 34 A4 format pages. Numerous drawings and sketches, including 6 pages of drawings specifically for a small Tesla turbine you can build. Paperback.



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It's All in "D-Tail"

Text and photos by Barry Potter

Many times I have been greatly impressed by the amount of time and effort that fellow modelers have put into the mechanical components of their creations, only to be disappointed by the lack of, or incorrect detail of the rest of the model.

This, I suspect, applies to all branches of our hobby, but as my particular interest is locomotives, I shall confine my comments to them. I must stress that the following comments are intended to be purely constructive and are not meant to imply any lack of expertise or care on any model engineer. I do not claim to be any kind of expert so feel free to disagree all you like. This is only a hobby after all, and you "pays your money and makes your own choice".

Most locomotive builders purchase a set of plans, or follow the directions published in one of the available magazines. They start out "full of fire", determined to produce the perfect model, only to realise that the amount of time needed is difficult to find, due to other more important commitments.

It is usual to start out with the frame and running gear of the locomotive. There is a great deal of work required in the manufacture of this and it must be done carefully if the machine is to perform up to scratch. Many published designs include

fully compensated leaf springs and complex braking systems and this adds greatly to the amount of time and work involved. Consequently many builders are justifiably frustrated by, or sick of the project by the time that the chassis is completed, and in order to "get going", eliminate as much detail as possible. This is a great pity as many really fine models are spoiled for the sake of a "hapenth of tar".

To my mind it is all of the knobbly bits that make an object what it is. If one was to make a model of a Rolls Royce and instead of fitting the familiar radiator with all of its square edges they decided that it would be quicker to round them off, would it still be a Rolls Royce. No! Actually it would be a Bentley. This is a bit "tongue in cheek" but it illustrates how small changes or omissions can make a significant difference to the finished object.

Many builders, starting out to build a small version of their favourite prototype, want to produce an engine that looks like the prototype. Why then leave off most of the bits and pieces that give the prototype its character. Or alternatively they make a great job of the mechanicals and a very ordinary job of really important details, such as the chimney and dome. How many engines have you seen with the chimney, dome and safety valves all at different angles? Also many are ill fitting and badly proportioned. We all know that some modelers are naturally gifted, and always seem to turn out the perfect job. However with some care and attention to detail, most not so perfect engines can be greatly enhanced. It is often just as easy to make it right, as to make it wrong.

Quite often builders justifiably look at their creations as a worthwhile investment, something that they can sell at a later date if the need arises. I have found

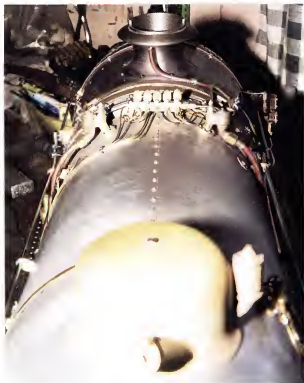


Photo 2

in my experience that it is the engines that really look like the prototype that sell, and at a good price.

When the urge strikes to start construction of your dream machine you have a number of options. You may decide to take the plunge and press ahead with your very own fully detailed AD60 class with working stoker, decide to settle for a simpler prototype that could be completed in a reasonable time, construct a freelance engine that can be as complicated or as simple as you like, or do nothing at all.

One other option is to go for your preferred prototype and to simplify any areas that cannot be seen. For example, complex leaf spring arrangements can be greatly simplified by substituting a simple but effective coil spring suspension. Many prototypes have fully compensated braking systems fitted. This can often be arranged to look right on the outside but can be greatly simplified on the inside. I have found that it is often a waste of time fitting steam operated brakes to any of the smaller types as they are generally ineffective or the wheels lock up and they just slide along the track. I do believe however, that it is worthwhile to fit a working hand brake to the engine if it is fitted to the prototype. Tenders need not have brakes fitted at all if they are not obvious, although it looks good if dummy hangers and shoes are fitted when they are.

I have seen a few really outstanding

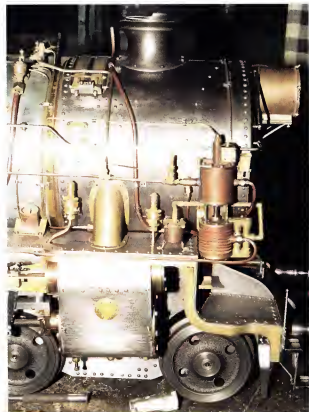


Photo 1

engines that have been fitted with slip eccentric valve gear. This can save a great deal of time and if the prototype is a tank engine, or has inside valve gear, need not detract from the aesthetics of the machine.

Recently I was approached by an old baldy headed friend who asked for advice on a problem that he had with an engine that he was building. His problem was with a particular piece that he was making. He was using a commercial plan and while the component worked all right when completed, it did not look right. I remarked that perhaps his brains were attached to his hair follicles and had fallen out with his hair, as there was a simple solution to his problem. Lots of Photos!

It is extremely difficult for the designers of commercial model plans to include much genuine detail in the drawings. For a start the drawings would be so complex that most amateurs would find them impossible to interpret. I find that it helps to locate a full sized prototype, if one exists, and photograph as much as possible. Photograph as much general detail around the boiler, cab, smoke box, frame, etc. as you can. Then as you are manufacturing each particular piece, refer to the photos in conjunction with the drawings and make the component look as much like the big one as possible.

The research can be fairly time consuming, and at times very frustrating, but the end result is very rewarding. If you have a good collection of books and magazines then you can look through them at night, at lunchtime or whenever you get a spare minute or two. Also by the time that the project is finished, you will have learned a great deal about it.

Photo 1 shows the front end of a 5"



Photo 4



Photo 5

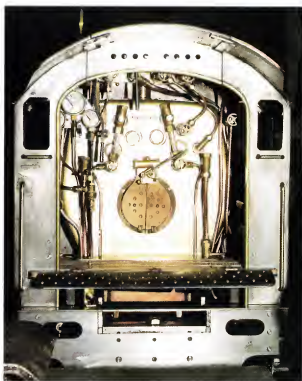


Photo 3

gauge NSW C36 and I think that it shows what a difference some research time and effort can make. While it looks rather complicated, any builder who can complete any locomotive to running condition, should be able to handle bending and soldering a few bits of wire and sheet metal. The biggest problem is knowing what to put on. Extensive use of photos and magazine pictures were used in this case. However in this particular case it took me quite a while to determine the correct rivet pattern on the smoke box, and details of the regulator access hatch, due to the amount of built up grime on the full size machines.

Some things seem to be designed to trick you up. The sand box filler, which is on the running board just behind the smoke box, stands up much higher than

the one on the other side. The reason for this is that when the engines were first built they were fitted with exhaust steam injectors and the large pipe that supplied the steam to them ran along the running board in front of the filler. This made it necessary to extend the height of the filler so that it was convenient to use. When they removed the exhaust steam injectors they did not bother to lower the filler neck and make it the same as the one on the other side.

The air compressor (water pump) is one of Warwick Sandberg's excellent products and has had extra detail added to make it look right for this particular engine. Cardew valves, pump governor and marker lamps are Barry Glover's investment castings.

The oil distribution valves shown in **Photo 2** would be almost impossible to replicate without the aid of photographs. As can be seen they are a complex jumble of valves and pipe work. The valves were all fabricated from brass rod and the pipes are bent up from 1/16" robin bronze brazing wire. Note the dummy seam along the top of the boiler cladding. This feature is usually missed out, because being on top

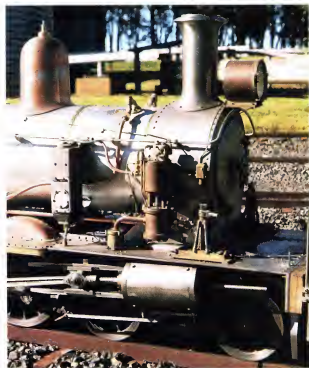


Photo 6

of the boiler it cannot be seen on the full sized engine. The groove in the cladding is produced with a dental burr fitted into a die grinder, and run along a straight edge taped to the cladding.

A tidy realistic cab layout, **Photo 3**, is a real asset to any engine. This one is not a close copy of the full size, but I took some care to make it as neat and tidy as possible. The three gauges, although expensive, look good and add a touch of realism to the layout. The centre gauge is boiler pressure and the other two are steam chest pressure and vacuum, as the engine is fitted up for simple vacuum train brakes. The floor boards and fall plate finish off the rear end. Out of sight are drivers and fireman's seats and the all important reversing screw.

Photo 4 shows the finished engine on the occasion of its first steaming. The 36 Class had a distinctive tapered boiler design. This was copied very closely as it contributes a great deal to the character of the finished engine. I was very careful to get the backward slope of the firebox just right. Virtually every detail of the full sized machine is included on the little one and I think that the result was worth the effort. As a matter of interest the regulator controls along the boiler side are all dummy fittings. It can be rather difficult to make them strong enough to operate the regulator and at the same time fine enough to look right. As a compromise I fitted dummies on the outside and operated the smoke box regulator with a rod passing through a tube inside the steam space of the boiler. Note the shorter sandbox filler.

In steam and on the track (**Photo 5**). It would have been further enhanced if I had fitted tyre rivets to the main drivers and oil boxes on the sides of the crossheads.

Photo 6 shows the front end of a 5 gauge NSW 30T. Note the re-railing jacks on the running board. This picture illustrates the benefits of time spent researching a particular prototype. All of these locomotives were converted into tender engines from the suburban 30 class tanks, and I knew that a few of them were converted by Clyde Engineering and the rest

by Eveleigh Railway Works. I presumed that they were all the same but found to my surprise that they differed in some areas. The sand boxes on all of the engines were taken from the front of the tanks and mounted onto the side of the boiler. When originally fitted to the tank engines they had a hand rail bolted to them. Clyde converted locomotives had the handrails left on while Eveleigh conversions did not. The driving wheel splashers were also different. Clyde conversions had much rounder splashers with a row of rivets along the inside edge. The rear splashers were quite different on both conversions. **Photo 7** shows the Clyde version. It was cast and nicely rounded off along the outside edge. Eveleigh engines had an all welded splashers with a square corner. Traps for the unwary! I have seen an engine with a Clyde rear splashers on one side and an

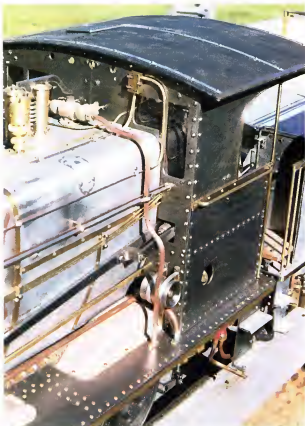


Photo 7

Eveleigh one on the other. Obtaining detail of the top of Belpaire fireboxes is always a problem, and the only real answer is to find one and photograph it yourself. It is worth the trouble as it is a very obvious feature on any locomotive model. The cab roof is covered with fabric to simulate the canvas fitted to full size roofs.

Photo 8. Finished and ready for the paint shop. I always make full use of the lost wax detail castings that are commercially available these days. They are very accurate reproductions and while some may think that they are a touch expensive, I think that they are well worth the investment as they add much more value to the model than their initial cost. They also save a lot of time.



Photo 8



Photo 9

Photo 9. Tenders are sometimes treated as an after thought but, are an important and integral part of the engine. Care should be taken to get the lines of rivets in the right place. Careful study of photos is the only real answer to this. On full sized tenders, some rows of rivets are very closely spaced, with the heads almost touching each other. If this is done on a model, the heads tend to blend into each other, so I generally space them a little further apart. With wider spaced rows I try to fit the correct number. The brake hangers and shoes on this tender are only dummies. Note the dummy water control valve behind the step.

The rear view of this tender, **Photo 10**, shows the marker lamps and ladder. The wiring conduits are dummy, as the wires to the LED's (fitted after painting) come into the back of the lamp bodies, carried through the water space in suitable plastic tubing. The air tanks on the top can be a real test of patience with the 30T tenders. There did not appear to be any detail drawings made when they were fitted, as there were a lot of variations in the pipe work between different examples.

However as all of the tenders were shared around between all of the engines, who is to say which is right or wrong.

Photo 11. Many of the NSWGR Standard Goods engines were fitted with steam cleaning valves. This is the small valve fitted to the side of the firebox in front of the injector steam valve. After I had made several of these engines, I found to my surprise that these valves were not manufactured left and right handed. Therefore the one on the left hand side had the handle pointing to the rear and the one on the right had the handle pointing to the front. You will notice that the brake hangers between the wheels have two different types of mountings. This is how it was with this engine, although for convenience I used nuts instead of split pins to secure some of the brake gear parts. The injectors and pipe work are nothing like the original, and are fitted up purely for efficient operation and easy maintenance. The coupling rods, connecting rods, and return cranks on this particular class are worth special mention. I found that there were two different types of coupling rods, three different connecting rods and two



Photo 10

return cranks. Any combination of these parts could be found to have been used.

Before closing I would like to mention a couple of tips that I have found to be helpful. When photographing full sized detail work, place an object of known size in the frame as this can be used later as a reference to determine the dimensions of various parts. I often use a piece of wood a foot long for this purpose.

A computer with a scanner is of great assistance. A photo can be scanned into the machine and the dimensions adjusted so as to enable a print to be made exactly scale size. For example if am working to 1 1/8" to the foot scale and I adjust my photo so that the wood is 1 1/8" long in the print, then the print is to scale size. This greatly assists in determining the proportions of the various pieces. The prints can be made in black and white.

Also the scanner can be used to increase or reduce parts of railway drawings to scale size. I then can measure directly from the drawing. Recently I scanned the drawing of a cab side into the machine and produced a print to the right dimensions. This print was then glued to a piece of sheet steel. It was then a simple matter to cut around the drawing and quickly produce an accurate copy of the cab side. I have used this technique several times with great success.

I hope that this article may be of some help, and that we continue to see the proliferation of good scale locomotives and rolling stock, but as I said before 'you pays your money and you makes your own choice.'

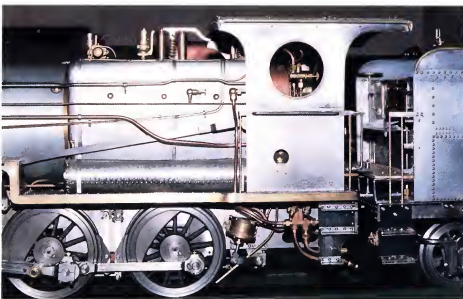


Photo 11

Electronic Edge Finder

By Les Kerr

Drawings and photos by the author

Being an Electronic Engineer by profession and having recently taken up model engineering, I thought you might be interested in the attached article on an edge finder I made and have been using for about 12 months.

When the tip of the device comes into contact with the work piece the electrical circuit is closed causing the LED (light emitting diode) to light. As it is such a simple idea I am sure it has been thought of before but in my limited experience I have not come across it commercially or in any other journals.

I have used it extensively on my miller to find the edge of objects. To do this you wind the dials on the miller so that the tip approaches the edge until the light just comes on. The edge is then half the thickness of the tip away. In my case the tip is 4mm dia which means that I only have to advance the dial 2mm to find the edge. In a similar way the centre of an object in a vice can be found very quickly.

I made the unit out of a discarded 2MT drill arbour, to which I silver soldered on a brass cylinder bored out to take 2 X AAA 1.5V batteries. The insulation material between the body and the tip was made out of an old chopping board, although any ridged machineable plastic will do. The LED is available from Dick Smith and I used a 150 ohm $\frac{1}{4}$ watt series resistor. The tip is held to the body by 4 screws, which are insulated electrically by using T0-3 transistor insulating bushes (also available from Dick Smith).

As the accuracy of the device is dependent on the concentricity of the tip to the arbour, the machining of the tip is done after final assembly. The diameter should also be machined to the highest accuracy possible.

Figure 1 shows an exploded cross sectional drawing of the various parts needed to make the unit. I haven't included dimensions because of the large variation in milling machine arbour



sizes. Figure 2 shows the cross section of the assembled unit showing the resistor, LED and batteries. It is important that the cathode of the LED (lead next to the flat on the body) is soldered to the resistor. Insulation should be placed over all the bare wires.

If the device is working correctly then the LED should light when the tip is shorted to the arbour.

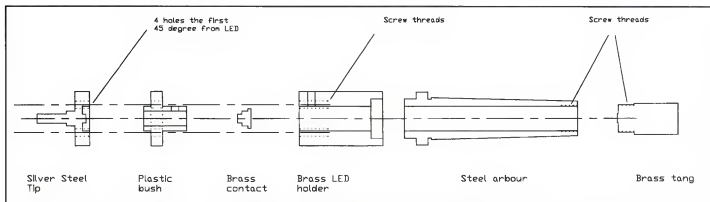


Figure 1 — Exploded Cross Section

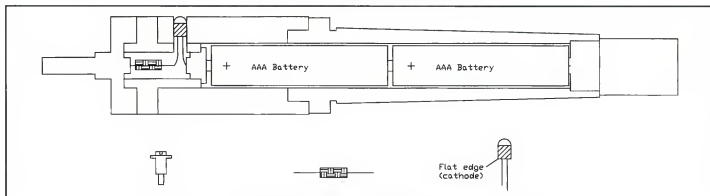
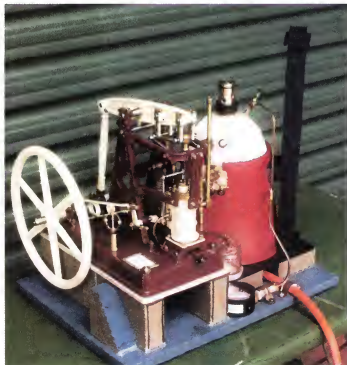
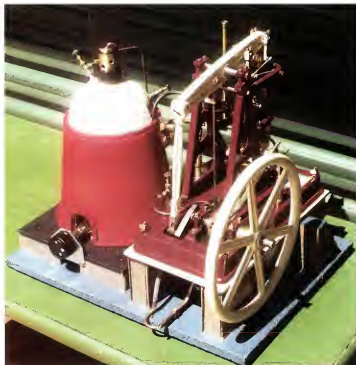


Figure 2 — Assembly Drawing

A Miniature Beam Engine and Beehive Boiler circa 1850

Story and photos by Bob Weir



Two views of the model. The left hand view shows the hot well underneath while in the right hand view Watt's parallel motion can be observed

This engine and boiler, pictured above, was constructed during the year 2000 as a part time project to gain appreciation of the technical problems encountered and overcome by our ingenious engineering ancestors in the 1800's. I learned a great deal, both technically and of profound respect, whilst constructing this working model replica. The beam engine had a great and illustrious history, making a formidable contribution to the industrial revolution. In fact some survived pumping water to the residents of London until the 1950's. The "Beehive" boiler had of course long been replaced with much more efficient and safe design. The limitations of available boiler materials and plate joining methods led to some spectacular explosions.

To commence, I sought out an existing beam engine design of a size that could be handled by my machine shop equipment and found it with the Edgar Westbury designed *Vulcan* engine. The accompanying boiler however presented a formidable problem which could only be resolved by my designing a hemispherical "Beehive" boiler. A set of castings for the beam engine was requested from England, but the problems of cost, no stock, delayed stock replacement and slow delivery made this unattractive. I then tried my friends in the U.S.A. Yes, they had stock and shipped the castings within 3 days.

I received the castings here in Australia, air freight, in about 2 weeks from order.

The machining and assembly of the gunmetal castings presented no problem, but making batches of square nuts of various sizes was tedious, even with specially made collets. However, square nuts it had to be to compliment the period. The engine test ran on compressed air satisfactorily, although the air consumption seemed to be excessive.

The boiler heating surface area was designed in accordance with K.N. Harris' formula contained in his book *Model Boiler Making*. The result was most disappointing. The engine quickly exhausted the boiler of steam. No amount of forcing with a considerably oversized propane burner flat out and with the stainless steel superheater coil glowing red, would the boiler deliver. What to do — here was a boiler built with confidence and completed in considerable detail — scrap it and start again! Then I thought of our engineering ancestors and the ingenuity they would apply. First thought was to reduce the engine consumption of steam, this was achieved by re-making the slide valve with the steam lap increased from 0.032" to 0.064". After valve re-setting, the engine ran more sweetly and consumed less compressed air. Full of renewed confidence, I arranged another test with the boiler. Once again disappointed, the boiler was

inadequate for the task. The only alternative then was to pack more heating surface into the existing combustion chamber space. I chose to add a coil of copper tubing positioned around the combustion space and connecting the feedwater line to this coil converting the boiler into a "hybrid flash" steam boiler with the original boiler acting as steam separator and accumulator. This modification was achieved with a minimum of fuss and no changes to the external appearance of the boiler. I wonder what our ancestors would have thought!

Success at last! The "hybrid" boiler easily supplied the engine, even on the lowest burner setting, and as a bonus, despite the delicate boiler modifications there were no leaks. No need to apply poultices of "cow dung and hay" the common sealing material of the 18th and 19th Centuries. The only slight problem arising was the management of the boiler. A balance has to be maintained between the propane burner setting and the feedwater by-pass valve opening. A little practice and this problem was overcome. One question remains — the engine definitely runs more smoothly on compressed air than on steam. It will continue to run down to 6 psig on air but only 9 psig on steam. Can anybody provide an explanation for this phenomena?

Australian Miniature Traction Engine & Steam Road Vehicle Rally

Mannum, SA — October 2001

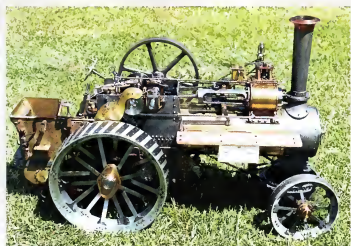
Story and photos by David Proctor



Gordon Blake drives his 4½" scale Burrell up the main street of Mannum

When my family and I left Canberra on Thursday morning to drive to Mannum I did not give the rain a second thought. After all Mannum is over 1100 kilometres away! However later in the day, heading west across the Hay plains, the rain was getting heavier. Hmm...

Next morning after an overnight stop in Pinnaroo the sky was still grey but things were looking better. Late morning saw us on the vehicle ferry crossing the Murray River at Mannum. What a lovely town with its old buildings, the PS *Marion* and the *Murray Princess* tied alongside and history evident at every turn. And if that wasn't enough, when we checked into the caravan park we found our cabin was only about 10 metres from the water's edge.



This beautifully detailed 1½" scale Allchin was built by Ken Preiss



Mark Hampton's Tasker A2 Little Giant Norman



John Weidenhofer's 3" Allchin was built by John Levers



Jeff Schaefer's freelance steam wagon always performs well



This shot of the PS Marion was taken from Arnold Park, where the engines were steamed and departed for the street parade — an idyllic location!

After shopping for provisions and lunch it was time to head to the rally venue, the local showground. There were already several people there and some had their engines in steam. Martin Yule from Sydney had his 3" Foden wagon lined up alongside another Foden which was built several years ago by Brian Niesche, and is featured on the cover of this issue.

The main centre of Mannum is down at river level and the showground is on land which is considerably higher. Some drivers were concerned about the length of the parade route for Saturday (just under 3k) and a steep grade down into the main street. Organiser John Levers gathered those present together to discuss the options with the result that some decided to do the original route while others opted to start from Arnold Park down in the town centre.

The rest of the day was spent socializing and admiring at the models present. Gordon Blake had a front wheel and the flywheel of his 4 1/2" Cliff & Bunting traction engine, all fabricated of course, and rather nice too.

Then it was back to camp for tea. Whilst admiring the river view, fellow Canberrans, Jim and Margaret Mitchell came strolling along and, just on dusk, while we were relating the day's events, the *Murray Princess* departed for a trip up river. Its most impressive and unusual hooter and the myriad lights were pure magic on the water in the evening twilight.

Saturday

Rain! All day! That did not stop the locals turning out in good numbers to see the various engines getting up steam down by the river. Arnold Park is an interesting place — the PS *Marion* is tied up there at the museum which also includes the Randell Dry Dock and the beam pumping engine which was used in the dock. Sausage sandwiches were on sale, very

nice they were too and the smell of the BBQ, the light



Two Burrells — Peter Hoyer's 3" scale model stands in front of Gordon Blake's version in 4 1/2" scale



Two 3" Foden Type C steam wagons — Martin Yule's on the left is almost completed, while the one by Brian Niesche on the right is an outstanding example of what Martin aspires to.



Some of the exquisite detail on the Foden built by Brian Niesche



Adrian Robinson about to place his fine 3" Cliff & Bunting in the photo line-up



Peter Hoyer from Adelaide brought along his 3" Burrell, one of two 3" Burrells at the Rally. The other one, built by Peter Bucknell owned by his son Anthony.



Alex Proctor learns to drive John Oliver's 2 1/2" freelance engine



Horrie Pearce of Bendigo SME built this model of James Booth's Rectilinear Engine. This design dates from 1843 and the rectilinear motion is based on the geometric principle that 3 equally spaced points on a straight line, moved along 2 straight lines in the form of a cross, will trace a circle with the centre point. This allowed for a low height engine, doing away with the need for a connecting rod.

rain and the steam in the air — great atmosphere!

Some of the engines were steaming up at the show-ground and the idea was that when they eventually arrived down at Arnold Park, all the engines then present would participate in a parade up the main street of Mannum. Somehow, this got a bit off track and a false start saw the engines in the park start off on their own parade, much to the concern of the police who were brought in from Adelaide to supervise the traffic and who were still at the showground. Anyway after the "trial run" the rest of the engines duly arrived and the proper parade took off. Some of the locals may not have appreciated the larger than usual number of blue uniforms present as I believe a few traffic



Peter Smith's 6" Ransomes in the parade heading up Randell Street

tickets were issued during the day. John Oliver's engine may have been the smallest in steam but he had no trouble leaving everyone else in his wake! One bit of excitement occurred when Peter Smith's Ransomes (the largest engine there, and the heaviest!) sheered a split pin and lost a front wheel, but a replacement pin was quickly produced and he was able to continue.

Away from the parade, Adrian Robinson's cabin was knocked off its foundations when a passing trailer came through the fence of the caravan park. He was accommodated in a motel for the night.

We all sat down to a very nice dinner on Saturday night and lots of prizes were given out to people who had the relevant lucky number on their name tag. The number of prizes was a reflection of the magnificent support given to the rally by the local business houses and organizations in Mannum — most impressive.

Sunday

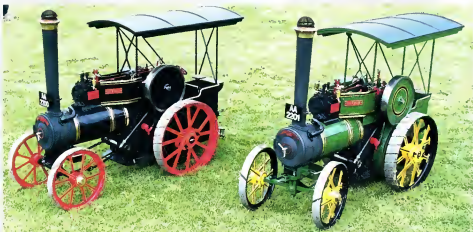
A lovely fine day and a great day for photographs. All up, there were 18 working models at the rally, including a Stanley Steamer, 2 Foden wagons, 1 Sentinel wagon, a freelance wagon, a Clayton wagon and 12 traction engines. As well as the engines participating in the rally, there was a good display inside the clubhouse of various small stationery engine models built by Horrie Pearce from Bendigo, and an exquisite 1½" super detailed Alchin traction engine built by Ken Preiss of Stonyfell in South Australia. Also on display were various castings and part-built models plus several components of an Atkinson steam wagon.

The usual informal meeting was held and confirmed that next year the Rally will be held in Canberra and that Lake Goldsmith are interested in becoming a future rally venue.

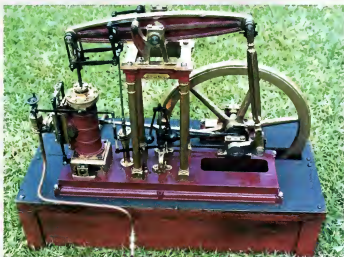
Most of the engines were to be seen in steam throughout the day, driving around the showground until their various owners decided the time had come to start packing for the trip home. Some left during the afternoon while the stragglers, yours truly included, enjoyed a nice dinner at the Mannum Club. See you all next year in Canberra!



A line-up of the models present. Peter Smith's Ransomes and Kevin Hyde's Stanley Steamer tend to dominate



Tasker A2 Little Giants — Colin Bamford's Cherry (black) and Mark Hampton's Norman



Tubal Cain's Four Column Beam Engine built by Horrie Pearce



A look at the other side of Ken Preiss' 1½" Alchin



Another "graduate of the John Oliver school of traction engine driving", Jim Mitchell from Canberra is building a 3" Burrell

Steam Chest



with Dave Harper

Hi there, steam fans, and welcome to the special 100th edition! I'm not sure how many *Steam Chests* that has included, but I do know my first writings appeared in AME back in 1989, quite a few words ago.

There has been some really interesting stuff turn up in the past couple of months, including an unusual steam engine that I'd never heard of before, and more remarkably, neither has Dave Sampson!

The Dake square piston steam engine

Even the source of this material is a mystery, as I stumbled on it tucked into an envelope in the library cupboard at the Boiler House. Now as I'm supposed to be the librarian there, this was something of a surprise, but it must have happened during one of the odd times I wasn't in charge (That's my story, and I'm stuck with it!).

Even more frustrating is the fact that not all the material is there, so if any one out there has any more information, I'd love to hear from them.

The rather poor photocopies that I found appear to have come from a newsletter and were written by someone who apparently found a Dake engine in an

abandoned factory and managed to buy it. The owner then managed to get some more information from the manufacturer, who was based in Ohio, USA it seems. The company also make (made?) presses, and most of the hits in my search of the internet were related to Dake presses.

Anyway, the bit of text I have says that the patent for this engine was taken out by Mr Dake in Dec 1889, patent no 395,039. A Frederick J Zellar lodged an improved patent no 1,067,705 in 1913.

Now to the engine itself — this consists of a rectangular outer frame with another square frame sliding to and fro inside it. Within this second frame another section slides up and down. A crank pin is driven by this inner frame and the rotary motion of the pin is derived from the two oscillating parts doing a sort of square tango. The diagrams make the action clear, and it seems not far removed from the action of the Scotch yoke system. The pictures, although not the best quality, give a clear idea of the appearance of the beast and its component parts. (Figures 1 to 4)

It seems that these engines were manufactured for quite some time, so they must have worked. Just another one of the many odd-ball varieties of steam engine that have appeared over the years, it

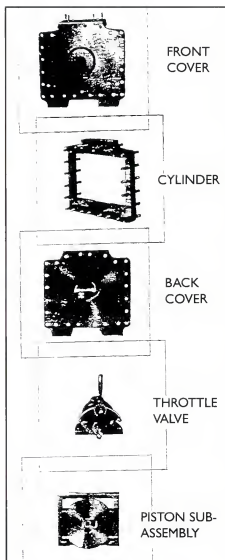


Figure 2

seems to be a contemporary of the Towers spherical engine which has appeared here.

Making a model of the Dake could be quite a challenge — machining the internal

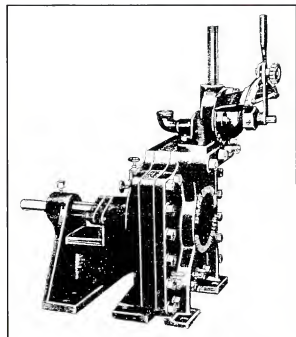


Figure 1

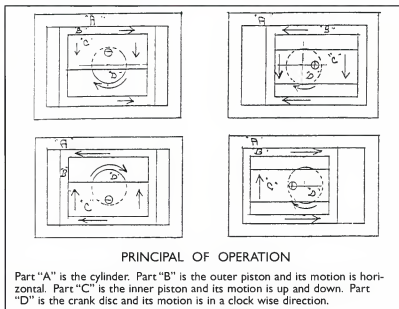


Figure 3

Part "A" is the cylinder. Part "B" is the outer piston and its motion is horizontal. Part "C" is the inner piston and its motion is up and down. Part "D" is the crank disc and its motion is in a clock wise direction.

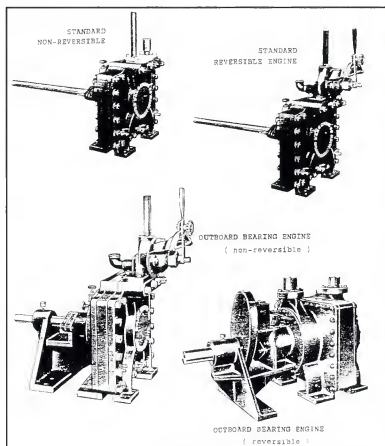


Figure 4

surface would seem to be a bit of a problem. Any takers?

More on the Little Husky

As mentioned in the last issue, Gil Macfarlane from Victoria was able to provide the source of this little engine. Gil has since sent me a couple of photos of the one he made all those years ago, **Photo 1** shows off the model very well.

And more steam winches

Gil also sent me a couple of photos of a steam logging winch which he spotted beside the Nunniong Road, north of the town of Swifts Creek, in East Gippsland. It was built by the Washington Iron Works, Seattle, and was in use until the mid 1960s.

The winch is a twin cylinder, twin drum job, with a vertical boiler mounted behind it. Although the pictures were taken in 1979 Gil tells me that the winch is still there, albeit minus a few bits that have been souvenired! (**Photos 2 and 3**) Thanks, Gil.

This neatly leads me into the next item, the catalogue of steam winches that Jim Libby kindly sent me. This is of the Richards & Hirschfeld Company of New York. The catalogue lists a whole range of winches which all incorporate their style of friction drive. This is the really interesting bit, as there is a full description of the friction drive plus a picture of the clutch assembly — something for which I've been looking for ages!

Figure 5 is the picture that came in the catalogue, and shows clearly the ring of V sectioned maple wood blocks bolted to the spur gear, and which engage into a matching groove in the drum face. The drum is forced into contact with the clutch by a double start screw and nut sleeved onto the end of the shaft. Pulling the lever, seen in **figure 6**, top right, turns the screw and forces



Photo 1

the drum onto the clutch, which apparently drives with only a light pressure on the lever. A spring on the shaft ensures the clutch releases when the lever is released.

Figure 6 is the basic single drum winch from the catalogue, and looks to be a good choice for a model. There is only a single set of gears, a single bar cross-head guide and disc cranks. The winch was also available with Stephenson's link reversing gear and a vertical boiler mounted between the cylinders. Sizes for this model were 16, 25 and 35HP, with cylinders of $6\frac{1}{4} \times 9$, $7\frac{1}{2} \times 10$ and $8\frac{1}{2} \times 10$ inches respectively.

The catalogue, which runs to about 25 pages, lists many other variations on the basic theme, with more drums, wheels for portability, etc.

Jim also sent me another catalogue from the same company listing a range of steam powered machines (including a steam powered cement mixer!) and oil engines, plus the *Defiance Machine Works Illustrated Catalogue* of wheel making machinery, and one of Tangye Steam Engines and Boilers. This is a wonderful collection of drawings and information, full of inspiration for model makers. I'll be happy to share a set of copies from these catalogues for \$10 (cash or money order, no more stamps, please). Just ask for the Jim Libby catalogues.

Incidentally, Jim tells me that these catalogues were acquired by his grandfather during his working life so they are almost a

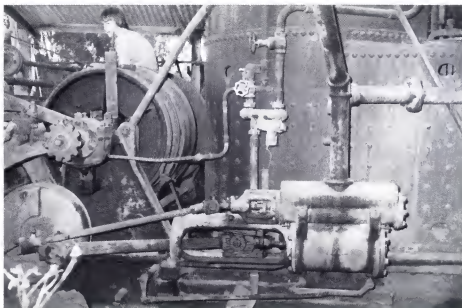


Photo 2

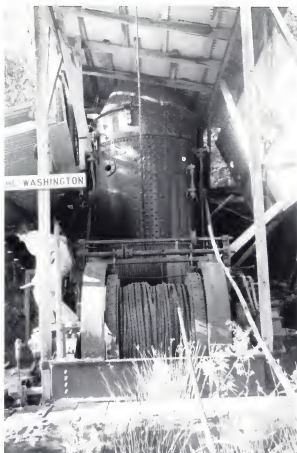


Photo 3

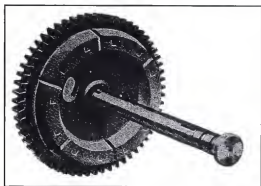


Figure 5

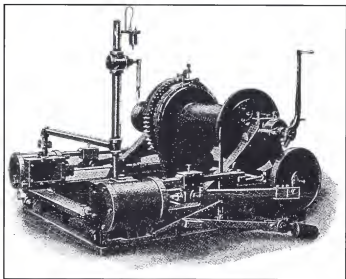


Figure 6

family heirloom. Many thanks for sharing them with us, Jim.

Figure 7 is one of the R & H engines, an unusual configuration designed as a feed engine in a sawmill. The reversing valve gear seems to be identical to that used in ships' steering engines, which have been explained in previous *Steam Chests*.

Another 'Dyson' type engine

Ian Griffiths wrote to me from Victoria enclosing some copies from his collection. One was from the *Aeromodeller* magazine, one of their '50 years ago' features, and shows the 'cone valve compressed air engine' that I featured back in issue 97, (July/Aug 2001). I guess that shows that what goes around, comes around! The other item was from Bert Pond's book on compressed air engines, and is another rehash, this time from the *Model Maker* magazine back in 1928.

This flat twin engine seems to work on the same shaft-valve system as the 'Dyson' engine which has proved so popular. The main difference is that this one, originally designed by William Pachasa, has a standard crankpin arrangement rather than the Scotch yoke style of the John Symons version.

The two sheets that Ian sent me have full drawings and instructions for this little engine, and I'll be happy to pass on copies on receipt of an SSAE from anyone interested. **Figure 8** shows the general arrangement of the engine. The rest of the drawings are to the same scale and would benefit from being enlarged to a more readable size. Thank you for that addition to the files, Ian.

An even older compressed air engine

George Searle, from country NSW, wrote to me asking for details of the cone valve engine mentioned above. George wrote that he'd found a picture of a similar engine in a booklet published by the Sydney Technological

Museum way back in 1937. The booklet was about the aeronautical work of Lawrence Hargrave, the British born but Australian based aviation pioneer.

George very kindly sent me a copy of the whole 38 page booklet, which I found very interesting reading.

Although probably best known for his work on man-carrying box kites, Hargrave earlier spent many years experimenting with model aircraft, starting with rubber band powered flapping wing types, then progressing to airscrew driven models with flat plate wings. During these experiments, Hargrave built a three cylinder radial compressed air engine which ran quite successfully. He then hit on the idea of fixing the propeller blades to the engine cylinders and the crankshaft to the airframe, thus creating the rotary engine. This became the favoured type of engine for many full size aircraft right through WWI, mainly built by the French Le Rhone company, and known as the Gnome engine. It is claimed in the booklet that this idea stemmed from Hargrave's model built in 1889. As he corresponded regularly with fellow pioneers in Europe, and never patented any of his designs, this is quite possible.

Hargrave went on to design and build several steam engines to power model aircraft, but apparently none was actually flown in a model. At this time Hargrave became interested in his theories on curved lifting surfaces, and went over to building kites as a more productive and reliable means of experimenting. He was dead right there!

Figure 9 is a close-up picture of Hargrave's first radial compressed air engine in its model. Being a copy-of-a-copy the quality is not too good,

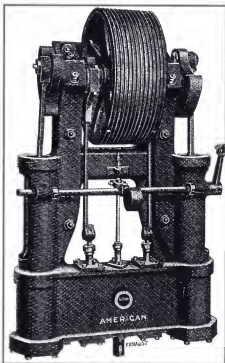


Figure 7

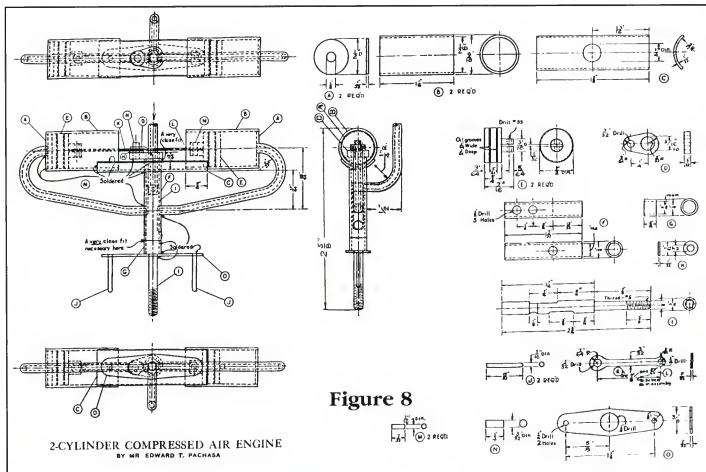


Figure 8

but enough to get the general idea, hopefully.

Lawrence Hargrave was one of those 'gentlemen of leisure' whose wealth enabled them to spend their time experimenting and developing the theories that underpinned the early aviation scene, and indeed, many aspects of scientific discovery during the 19th and early 20th centuries. Their contributions are rarely recognised today.

Thank you, George, for bringing this information to us. I guess I could make copies of all or part of the booklet if anyone would like them. Give me a ring or an email, and we can discuss the matter.

The Tangye Soho engine

Finally, here is an item from the Tangye catalogue, kindly sent by Jim Libby, as mentioned above. I selected the Soho engine as it represents almost the final development of the small horizontal steam engine, with enclosed crankcase, splash lubrication and flywheel governor. See **figure 10**.

All these features were carried over onto the early gas engines, making this a truly transitional type.

The Soho engine was made in sizes from 4" bore and stroke, giving $4\frac{1}{2}$ hp at 450 RPM up to 10 x

10 giving 40 hp at 250 RPM. These powers were at 100psi steam pressure. The smallest engine had a 30" dia flywheel and weighed approx 180lbs, the largest had a 50" flywheel and weighed in at 930lbs.

These engines must represent just about best practice of the British small engine manufacturers in the early 1900s.

That's all for this time, here's to the next 100 issues of AME!

Remember, you can email Dave at sandave@bytesite.com.au

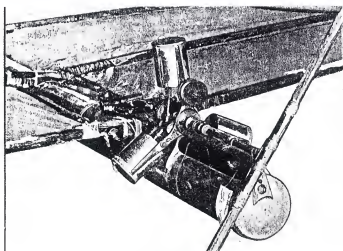


Figure 9

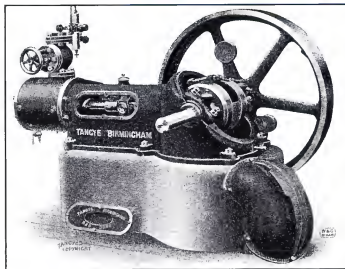
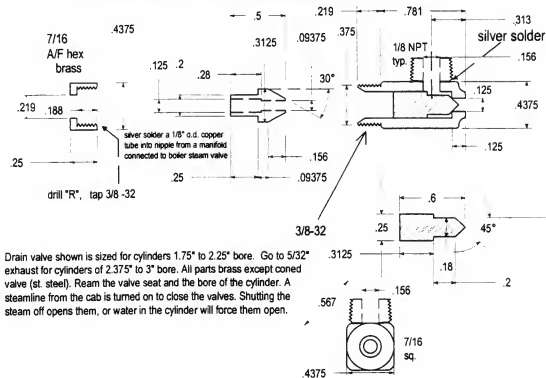


Figure 10

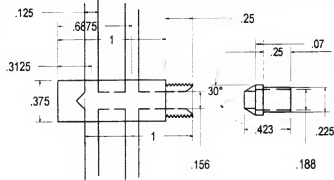
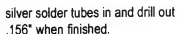
By Lindsay McDonnell

I have been using them on my *Brithania* 4-6-2 and they are reliable and best of all, fail safe. To operate them, a steam valve in the line from the boiler is needed. A Teflon ball valve under the cab floor with lever into the cab is good. A small manifold for distributing the steam to each cylinder, using $1\frac{1}{2}$ " o.d. copper tube for the lines from the manifold and $3\frac{1}{2}$ " o.d. from the steam control valve to the manifold is easier to fit than levers in conventional set ups. The manifold should be down near the cylinders. These drain valves are almost essential on piston valve cylinders as they open automatically if a shot of water gets into the cylinders due to high water or

STEAM-OPERATED CYLINDER DRAIN & AUTOMATIC RELIEF VALVE

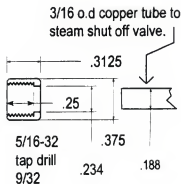


Drain valve shown is sized for cylinders 1.75" to 2.25" bore. Go to 5/32" exhaust for cylinders of 2.375" to 3" bore. All parts brass except coned valve (st. steel). Ream the valve seat and the bore of the cylinder. A steamline from the cab is turned on to close the valves. Shutting the steam off opens them, or water in the cylinder will force them open.



1/8o.d copper tubes
long enough to reach
the cyl. drain valves.

steam manifold to
supply drain valves



designed and drawn L. McDonnell

pressible, will push the valve back against boiler steam pressure and it relieves the pressure of water immediately and the valve closes again. You could say these drain valves are foolproof. The idea is not new as there have been various versions published but I have made mine as straightforward to build as possible. I used 32 threads per inch threads on the unions but you can substitute other threads. So here are the instructions for those wanting to try their hand at machining.

Main body

Part off the number required of 1" lengths from $7/16"$ sq or round brass rod. ($1/2"$ sq. OK) Turn one end down to $3/8"$ dia. along for $7/32"$. Use a die in the lathe to cut $3/8$ - 32 thread (7 turns). Repeat for all. Other threads are possible to suit your job.

Make the vertical threaded spigot to attach to the cylinders according to the thread required. For $1/8$ NPT buy some brass machined plugs, turn the wide end to leave a short $5/16"$ dia. spigot to locate it in the body. Drill out the inlet to $5/32"$ after silver soldering in.

Take the main body, mark off $5/16"$ from the exhaust end and drill $1/4"$ hole, $1/8"$ deep. Use a depth stop on the drill press. A steel jig to slide the body into is good practice. Silver solder (brazing) in the inlet spigot with 40% silver solder (Easyflo). Pickle the body or clean with emery cloth to remove scale. Hold the exhaust end in the 3-jaw chuck, drill right through with #31 drill. Run a letter 'D' size drill for $13/16"$.

Ream using a $1/8"$ dia. chucking reamer. Ream using a $1/4"$ chucking reamer until it bottoms. Run a $1/4"$ dia. 'D' bit (see note) for $7/8"$ depth to make a flat seat. (I made this from $1/4"$ drill rod, machining half away). Run the $1/8"$ reamer through again to take out burrs. Run a large enough centre drill into the end to form the seating for the union cone. Turn the valve end for end in the chuck and with a round nosed tool shape the end to a more conical appearance.

Piston needle valve

Take $1/4"$ dia. ground stainless steel rod, turn down to .180" dia. by $5/16"$ long. Set top slide over to 45 deg and machine off to almost a point. Chamfer both edges of the $1/4"$ dia. so there is no lip. Part off $5/8"$ along. Repeat for number required.

Union cone

Take $5/16"$ dia. brass and part off the required number of $7/16"$ long. Turn one end to .242" dia. along for a $1/4"$ Drill No. 20 for a depth of $1/4"$ (allows room for silver solder with $1/8"$ tube). Drill $1/16"$ dia right through. Repeat above for each. Turn end for end in the chuck. Pivot top slide to 30 deg and cut a taper leaving a $1/32"$ shoulder.

(Reproduced from The Whistle, the newsletter of the British Columbia SME)

Tuning a Mill File to Cut Brass

By Kevin Pullen

When a new mill file is used on brass, the usual result is unacceptable vibration. The tendency for the file to vibrate can be eliminated by tuning the file in the following manner

Take a piece of round HSS about 10mm in diameter with ground finish and hold in a bench vice. Allow about 4mm of the rounded surface to project above the jaws. The length of the HSS must be more than the width of the file. Fix handle to file. Place the file in contact with the HSS adjacent to the tang, and pressing down with sufficient force to bend the file, draw the file steadily, not fast, and not stopping, backwards across the HSS. Try the file on a piece of brass, if the file vibrates, repeat the process. Usually, the file will produce a good finish without vibration on the second or third draw. Stop the process when the file ceases to vibrate. Mark the file for identification in some manner so it cannot be accidentally used on other metals. Use only on brass, not even on bronze. Keep the file free from oil and always put down on a non-metallic surface.

Two modifications have been produced by the process. One, all the teeth have been made the same height. Two, the sharp cut-

Union nut

Part off $1/4"$ long pieces from $7/16"$ A/F (across the flats) Hex brass. Face the end and chamfer the edge with a round nose tool. Centre drill, then run a $1/4"$ drill right through. Drill $3/16"$ deep with an 'R' drill. Run a $5/16"$ 'D' bit (see note) in to square the bottom. Tap in the lathe $3/8$ - 32 for 6 turns. Repeat above. Chuck the other end, face and chamfer. Assemble the parts and see if the needle valve slides freely. If tight don't force it into the bore. Put it in the lathe chuck holding the small diameter, and use emery cloth to sand it lightly. Try it in the body until it doesn't bind. Check the exhaust end by sucking to see if you have a good valve closure, hopefully it'll hold a vacuum on the end of your tongue. Oil from the cylinder will help seal the valve as will the boiler pressure. A light tap with a hammer may be needed to seat it if all else fails.

Steam distribution manifold

You will need one to send the steam to the four drain valves. Chuck some $3/8"$ dia. brass and part off 1.25" long. Chuck again and turn to $1/4"$ dia. and run a $5/16$ - 32 die along for $1/4"$ (8 turns). You can use other threads. Centre drill and then run a $5/32"$ drill down for 1". Run a larger centre drill in to form the seating of the cone. Mark off the $5/8"$ drill holes and carefully centre pop and drill holding firmly in a vice in the drill press. Note the end hole is used for attaching the manifold to the chassis should it be needed. Push some shiny $1/8"$ o.d. copper tube right through the two $1/8"$ holes nearest the threaded end, flux and silver solder in.

Make sure each of the tubes is long enough to reach each cylinder drain valve. They can be bent to fit but it's tough to lengthen them. Run a $5/32"$ drill into the manifold through the two tubes. Clean (wash and blow) out any chips thoroughly. Make the union nut and cone as before. Silver solder on each union cone that goes into the drain valves (put the nut on the tube first). Run the $3/16"$ copper tube from the manifold back to a steam valve that doesn't leak. A Teflon ball valve is one suggestion, or a needle valve. Run this into the boiler manifold. In operation, close the steam valve to open the drains, leave steam on to close the drains. If you forget to open them when cylinders are cold, or you prime the loco, don't fret, they're foolproof!

NOTE: 'D' bits can be made from 'drill rod' to the size required. I made a set up from different sizes of what the British call silver steel. A 5 degree facing cut is milled across the end. Then the rod is milled to exactly half the diameter for about $1/2"$. The end of the drill rod is then heated with a propane torch to a cherry red, and then plunged into water. This hardens it. They are great for making slightly inclined seats for check valves.

ting edge has been bent forward slightly, so presenting a narrow flat edge which retains the original sharp edge. The relief angle (face angle) is increased so the cutting edge is presented to the work more like the blade of a wood plane.

The process described may be applied to a worn out mill file for a different application. This file is useful for two purposes. One, putting a nice polish on small steel components in the lathe without removing much metal, only the peaks of the turning marks will be removed. Two, removing the raised metal surrounding dents on precision ground surfaces, such as the taper on drill shanks.

The file works in the following manner. The file is blunt, very blunt and will not cut when in full contact. Large area of contact, low penetration stress. Any metal protruding from the surface will be cut. Small area, high stress, when the protruding metal has been removed cutting stops automatically. Six to eight inch files seek to be the most suitable as they have a finer pitch than 10" files of the same grade.

Don Nowell — Master Craftsman

By Paul Garson

He designs, manufactures and fabricates on a level previously reserved for the famed house of Faberge. While his works of art are hewn from metal alloys and not egg shells, Don Nowell's creations are destined as museum pieces and as centerpiece's for a rarefied class of collectors. A resident of Granada Hills, California, a state known for custom built vehicles of all descriptions, Don builds motorcycles. Not the kind that roar down quarter mile dragstrips or pose on Rodeo Drive in chromed splendor, but scaled down versions you can hold in your hands. Yet inch for inch, ounce for ounce, they are meticulously rendered and exquisitely detailed as any show winning. There's the rub. These hand-painted, hand-assembled marvels require a trained eye to appreciate the depth and dedication required for their creation.

"Unfortunately, people are used to seeing plastic models that are glued together in a few hours, and sometimes give my work only a passing glance," says Don who literally spent years in the preparation of his two-wheeled wonders.

The story of artistic achievement and angst stretches back some forty years when Don, as a student at San Fernando High School, designed and built a small motor in an electric shop class. The motor won a Rotary Club contest, and literally set the wheels spinning for his future endeavors. Don, graduating from high school, soon entered the world of hotrod '59 Chevy's, hanging at Bob's drive-in with the other young street racers. But cruising Hollywood Boulevard wasn't enough, so Don moved into serious racing with a custom built B/Gas '37 Chevy Coupe drag racer. His hands-on skills were developing



It is hard to believe that this exquisitely detailed model is only 23 inches long

thanks to college welding courses and tech school in the Air National Guard.

His homebuilt car soon was winning races and car shows as well, eventually being featured in a 1965 issue of *Hot Rod* magazine, the Bible for high performance car enthusiasts. Supporting himself as a carpenter, Don's track successes and magazine recognition soon enabled him to work at a racing engine shop in Van Nuys, Bartz Engine Development, that happened to be working for such legendary racers as Bruce McClaren. After a year and half at the shop, he started his own business in 1968 building racing engines and branching out into racing and ski boats as well, a relationship with the Patterson Brothers in Van Nuys lasting five years. It was in 1969 that Don invented and patented the Kwik-Seal tool for valve job and racing engine

repairs that brought him more recognition and business as well.

In that same year, after building engines with Jerry Titus and the factory Pontiac Trans Am team, Don ventured into yet another high performance sports area, motorcycles. He began designing and building his own frames, and was now hooked into the two-wheelers. His expertise in four-wheeled conveyances however steered his professional career over to the J.B. Nethercutt automobile museum where he restored a 1924 McFarland that had belonged to silent screen star Fatty Arbuckle, the car winning its class that year, 1975, at the famous Pebble Beach Concourse d'Elegance. "It was a nice feather in my cap," says Don.

Flat track motorcycle racing garnered his attention in the late 1970s as he began



These two views of the front fork and hub and the gauge well illustrate the standard of detail Don achieves with his models



The burnished metal finish on this EVO Chopper is most effective



This Knuckle Chopper was commissioned by the Harley Davidson Museum in April 2000



This beautiful machine is the same bike in the detail shots at the bottom of the previous page

making brake components, and crossed paths with another motorcycle enthusiast, actor Bobby Carradine for whom he built a custom Triumph which was then featured in *Motorcyclist* magazine, drawing attention to Don's motorcycle building skills.

His skills came to the attention of Fred Thompson of Smith-Miller Toy Trucks. "I did some model work for him and one thing lead to another, and I started designing and building toy trucks, fabricated from sheet metal and cast aluminum. I made the models and the molds for the castings, and was soon busy in this new field, while still playing with motorcycles on the side."

This "hobby" led to the building of another custom bike for Bobby Carradine's half-brother, actor Mike Bowen. The special BSA triple cylinder machine appeared in a 1987 issue of *Motorcyclist* magazine. Meanwhile, Don's personal shop was now filled with the tools of his trade including a mill, a lathe and a heliac in addition to his design work equipment. "I kept building toys for Smith Miller, 14 different toy vehicles in all, manufacturing five myself."

In yet another twist attesting to his multi-talents, Don was hired by a dental equipment company called Proma of Carson, California, to produce vacuum-formed plastic models for a new look that would change the traditional look of their product line and take them into the 21st Century. His work now entered another main stream industry. "I went into making fixtures and tooling for various companies as well as welding and drilling and milling applications. But after 13 years of toy designing and building for other companies, I wanted to make my own statement, create something new and with my own stamp on it. So in 1994 I arrived at the idea of making a model bike. It took 13 months from a blank sheet of paper to the first finished example. I was able to give it a splendid debut at the Peterson Automotive Museum in November of 1995."

Don started building that first bike on September 20, 1994. Using a full-size bike to determine his dimensions, he decided on a quarter-scale adaptation. After calculating all the various segments to correct ratio, his next step was figuring out how to make a laced front wheel in-as-much as motorcycles traditionally used spoked wire wheels. He designed and built a fixture to hold the rim and the hub, then turn them up on his lathe, drilling holes and lacing stainless wire through them as spokes. "Once I had that figured out, I knew I could build the rest of it. I went to a rubber mold shop, they put me in touch with a mold builder resulting in the production of the correctly scaled tyres based on scaled down 21-inch front and 16-inch rear rubber. The first prototypes were slicks without tread, the tread design later provided and approved by the Avon Tyre company in England (a front Roadrunner,



Lowered Fatboy with 3-spoke billet wheels and showing the primary belt drive



A customer in Germany commissioned this Knuckle Chopper



Softail with 3-spoke billet wheels and low bars

a rear Super Venom), an indication of Don's drive for meticulous authenticity. It was his own chore to design and build the mold for his treaded tyres. This involved precision calculation as to rim and wheel fit and spacing as well.

Work on the frame was the next order of research and development, a long, painstaking and expensive undertaking. Although he was building a one-quarter scale vehicle, it required all the intensity of design of a full-sized model, perhaps even compounded by its smaller dimensions. The frame required bending the raw tubing, fabricating fixtures to hold the frame project, milling and mitering of all the joints, a very labor intensive activity.

After having the die set made for the front fender, it was stamped out of sheet metal. "I finally decided to cast the gas tanks out of thin wall investment cast aluminum, and then fabricated the rear fender out of one-piece aluminum using a CNC milling machine which guaranteed straight, parallel lines without wrinkles."

The next hurdle was the engine and transmission. Don made all the prototype components from 6061 aluminum billet utilizing his milling machine and lathe. He then linked up with a foundry that was able to take the molds off the prototype engine, cylinders, transmission and carburetor. "Then I had them cast out of aluminum, and it was a great joy to see them come out perfect."

After making fixtures to hold the parts, a major task in itself, Don was able to machine the components to exact tolerances and likenesses, especially the crank shaft and cylinder intersection which line up to form the correct "V" angle of the vee-twin engine configuration. This required an exact alignment of all the various bolt holes, exhaust pipe apertures, intake manifold and rocker boxes.

Entering the exhaust pipe phase of development, Don found he had a problem with finding the proper material for their production. "The thin wall material did not want to bend properly without cracking. I started with one inch bar stock and drilled them out. Then I was able to turn down the front part of the pipe on my lathe, then have them ground down to the 7/16th inch diameter required. At that point, the rear section gets bored out with a taper, then outside shape is cut on a lathe, followed by sanding and polishing. They go in for bending, cutting and welding up of the brackets, and finally to the chrome shop. This long and involved process was the only way I could produce a smooth pipe without worrying about a seam showing at the welding point. Time and money consumed notwithstanding, it was the only way to produce a first class finished component."

Don's last statement neatly summarizes the entire effort. Point-in-fact the Avon tyres previously mentioned. In final form, they even display the Avon logo and the small inscribed arrows indicating tyre rota-



This Fatboy, delivered August 2001, is the newest bike at the time of writing

tion direction as well as stating tyre size and tubeless design. Again, first class all the way. They say greatness is in the details, and Don's tyres are a perfect example. "I wanted to have something that was just as nice as I could make it, and that's exactly what I came up with. I'm still really tickled about those tyres."

Other rich details abound. For example, the model's seat is fashioned from soft foam covered with glove leather. "It looks and feels like the real thing," says Don. As for the speedometer Don saw to it that the little red tip on the indicator arm was there, and that the odometer's last number is correctly colored red. Intricate detailing as we said, and such that takes a careful and appreciative examination. The shifting levers also function featuring a ball

detent on the transmission so that it clicks to neutral when the shift lever is moved up or down as with a real motorcycle. The hand levers are fitted with spring, with a piece of rubber inserted on both the clutch and brake side to simulate the real feel of their operation. The bike's feature working suspension, both front and rear with three-quarters of inch travel, mimicking full-sized machines. The front end forks sport down tubes cut from ground stainless tubing. Don's even gone so far as to make molds for the headlight and tail light lenses, themselves made from plastic like the real articles.

Paint is of the utmost importance, whatever size be the vehicle. Don offers a choice of four different colors, all in pearl tones including candy orange, blue, red

and black with a candy burgundy stripe down the center. Tasty paint schemes indeed as befitting custom motorcycles. As for the metal pieces, all the aluminum on the model, other than the castings, are made from 7075 billet, and polishes up to a brilliant luster. Looking closer, one sees that the derby cover and inspection cover on the engine are separate pieces, and literally bolt on.

Speaking of bolts, and they are tiny, Don created special stainless hardware. You can see them at the swing arm pivot bolts, triple clamps, and axles. Made from scratch, they all carry the same custom look throughout the bike.

Currently, in very limited numbers, the following styles are available: the Custom Softail, the '90s Style Chopper, and the Lowrider which features billet wheels and rotors. Don is completing a special custom model fitted with a running and incredibly detailed Knucklehead powerplant, the engine built by the legendary Replica Engines of Gulliver, Michigan. Yes, a running engine! He's also finishing up a new style Springer front end that is adaptable to any of his models which will add even more variations in his model line-up.

Exactly how many pieces go into each model's construction? Don answers with precision, "There are 215 pieces in all and 152 screws. The bike is 23 inches long, 8 inches wide, 11 inches high and weighs 12 lbs." But as seen, the final product is definitely more than the sum of its parts. It is a work of love, and a lifetime's achievement, albeit in miniature, and therefore deserving of all its accolades. As Don says, "It seems that after being here 55 years, there are a lot of compromises people have to make. I've done a lot myself, but with this model I have not compromised one bit, and I'm extremely happy with the outcome. For once in my life, after all the engines and cars and boats, I feel I was able to make something that is perfect. The bottom line is that this is a world class model. It's what I was shooting for, and it's what I've arrived at." He's also arrived at a price for the models. US\$15,000. Like we said, these are museum quality creations, very unique, and very labor intensive to say the least.

Don says that he now has six styles of bike in his range:-

- Standard Softail
- Trick Softail
- Standard Fatboy
- Trick Fatboy
- EVO Chopper
- Knucklehead Chopper

A very few of these rare models are available from Don Nowell Design, P.O. Box 33321, Granada Hills, CA 91394 USA, or call (818) 363-8564.



Don Nowell proudly shows off some of his motorcycle models

The Mudgee Wine Festival Runs

Story and photos by Peter King

The annual Mudgee Wine Festival was staged during September 2001 and the Mudgee Miniature Railway again opened up the track to visitors from other clubs. Saturday was play day while the Sunday was public running day.

Over the course of the 3 weekends we had visitors from Hornsby, Wagga Wagga, Lake Macquarie, Orange, Tamworth, West Ryde, Blue Mountains, Bathurst, Bankstown and Wandong (Vic). All up, there were a total of 71 visitors along with 25 locos (21 steam and 4 diesels), all 5" gauge, along with some locos and a steam roller belonging to local members.

Running on Saturday was in the clockwise direction and the reverse on Sunday. Whilst Saturdays saw a BBQ tea, a hot food van, supplied and staffed by the Australian Air League — Mudgee Squadrons catered for the hungry ones on Sundays. The weather was fairly good, except for a little bit of rain on the first weekend and everyone seemed to enjoyed the rural setting of the Mudgee track, 6k from town, amongst the vineyards. It was pleasing to see several scale freight trains of various prototypes during the course of the Festival.

We would like to thank all who attended and hope to see everyone in September 2002 for the next Mudgee Wine Festival.



Roger Kershaw from Orange with his 5" NSWGR 34 class loco and a very respectable freight train in tow.



Ted Gray from Hornsby driving his petrol powered 0-6-0 BR 08 class shunter



Paul Dove from Hornsby on Mark Stapleton's 5" 3819 at the station



Mudgee member John Strahorn with his gas-fired 3 1/2" gauge 0-6-0 Rob Roy



From West Ryde, Bernie Courtenay's 5" SMR 10 class 2-8-2 loco

Discussion Forum

The Discussion Forum has been running for six months now and many opinions have already been expressed. We will wrap it up with this issue and the following three contributions:

Scale or model?

The current argument tagging in our hobby about whether "BIG" or "LITTLE" railways are compatible seems to me to have several aspects. There have been arguments advanced for separating daytimes of operation, etc. in the interests of safety and comfort for the owners of various types of equipment. (The classic analogy of having a huge big "B-Double" tail-gating a Mini Minor at 60 mph).

I am a bit tired of hearing the statements put forward (in some cases by very experienced model engineers) about those huge 7 1/4" g. "monstrosities" giving our little 5" g. scale models (e.g. *TICH*, etc.) a hard time. Track gauge, as such, is like the "Flowers that bloom in the spring" has "nothing to do with the case". The size of the model depends entirely on the prototype loco being modelled and the scale used to model it. (If indeed it is to scale at all, which many are not).

I always like to quote, as a classic example, the SAR 830 class diesel (equivalent to NSW 48 class). SAR has operated this same class of locomotive on the 3 different gauges contained within that state, namely 5'3", 4'8 1/2" and 3'6". Now the big locomotive has exactly the same chassis in all cases, the only difference being the bogies. (In fact, the locos, in service, are frequently changed from one gauge to another as traffic requirements demand.)

So if, as a modeler, you were able to decide to build a true scale model of the loco in its 5'3" gauge version, the model would be only 2/3 the size of the 3'6" gauge version of the same loco, irrespective of the track gauge for which you chose to build it.

Warwick Allison with his WAGR V Class and John Wakefield with his S. African 15F have both chosen to model 3'6" g. models which were quite large in full size. As a result their 5" g. models are larger than my 7 1/4" g. SAR 600, yet all three locos are about the same size in real life. And so it goes on. There are numerous examples of various 5" g. locos around the clubs which are quite a bit larger and heavier than a lot of 7 1/4" g. ones (e.g. Alan Douglas' "Rangely Lakes").

The Diamond Valley Railway has evolved over its 40 years of operation as an operating light railway and does it extremely well. Because of the heavy traffic requirements everything is large and heavy by model engineering standards, and most of the equipment — locos and rolling stock — is to 2" scale (for 5'3" full size) so the railway ought, theoretically, to be running on 10 1/2" g. track, for everything to be kept in strict conformity. Alternatively and conversely, it could be looked upon as being meant to be representative of 3'6" track gauge full size. However the club, having begun with 7 1/4" g. is quite happy to continue with same, albeit with oversize equipment and very heavy 14lb rail, but it suits their operation.

So let us have no more of this nonsense about 5" and 7 1/4" g. track. The track gauge is NOT the problem. What very much is the problem is the SCALE. We can have all the dispassionate arguments we like about different size locos and their merits, but not based on track gauge.

Diversity is the name of the game. What is so wonderful about our hobby is that it enables each of us to be the individuals we are, and every one of us has a different angle of what we consider to be model railroading. Because there is such an infinite variety of prototypes to copy (with steam locomotives particularly) each of us can have his (her) favourite(s) and enjoy and cherish it for what it is.

What I find particularly enjoyable at national conventions is the very thing that some people see as a problem and complain about, and that is the infinite variety of equipment in procession, especially on dual gauge tracks like Cobden. One will see a very large (some would say oversize) 7 1/4" g. loco and appropriate riding carriages followed by a 5" g. model of a standard gauge loco with a great long train of beautifully crafted rolling stock representing many different full-size freight or passenger stock. And this, I believe, is the essence of our hobby. Everyone can be happy. You are not forced to like what other people do. There can be little doubt that, if hauling the maximum number of passengers with minimum fuss and trouble, and least maintenance pos-

sible, is the name of the game, then the oversize relatively simple narrow gauge type locos (steam or diesel) win hands down. But is this what we are really about?

I know we have to pay bills and passenger haulage is our only source of external income so it is a more or less essential part of the operations. Some people seem to derive a great deal of pleasure from this exercise. To others it is a chore that has to be endured to be able to afford to have a track on which to be able to operate their true-scale exhibition masterpieces, whilst to others it is a means of playing trains in a sort of a way. But whatever our source of pleasure (and it must be some or we would not be there) in the club scene, it has to be dovetailed in with a lot of other individuals whose ideas may not necessarily coincide with our own, or not entirely anyway. In the long run it all boils down to one word, as Ron May so aptly stated in his item in the last AME, "tolerance". Just as, reverting back to our earlier example of the Double and the Mini having to share the road, so do we have to share our tracks with other rail vehicles of various sizes.

As far as I am concerned I see no problem with mixed sizes, provided clubs set reasonable speed limits (which they may choose to be different on public days and on club-only play days) and to ensure adequate head-way between trains, and good braking to avoid collisions.

Just like Ron, I say, "Let us share and enjoy our wonderful hobby harmoniously". Life is too short...

Murray Hill (Victoria)

We are all one hobby

I do not like to get involved in debates normally, but when I read the various letters in the discussion forum of the October 2001 AME, talking about crossroads and vs them, I felt I had to have a say because I think they have all lost the plot. To start with I believe there is no question that we are all involved in the same hobby. We all like miniature railways for one reason or another and I believe each of the various groups has as much right to their particular preference as any other. The question raised was — should we be doing all of the various things we like to do on the same track or at the same time?

For example, is it appropriate to mix semi commercial passenger hauling with fine scale small gauge timetable running? This in no way implies that one form of the hobby is better than the other for each has its devotees. But you must accept that the ideal track for fine scale running is not ideal for serious public running and vice versa. A fine scale 5 inch gauge loco will often have trouble trailing a set of dual 5 7/8 inch points while a large 7 1/4 loco that is ideal for hauling large loads week after week may damage a set of points set to finer scales. You only have to compare the various wheel standards to realize how much difference there is, not to mention loading gauges and clearances to buildings.

Those who follow motor sport will remember the early Bathurst races when all classes ran together. As time progressed it became obvious that the practice was causing problems and the smaller classes now run on the same track but at different times. But all motor sport from V12's to go-carts is still under 1 group known as "CAMS". What is wrong with us? Why have only one convention site that has to satisfy all? I have driven a number of large 7 1/4 locos and it can be difficult to see a person in front of you hunched over his small 0-4-0 firing like mad to keep out of your way. I have also driven the 0-4-0 and can well remember the hairs on the back of my neck stand up as I beheld a 1/2 ton Hudson with 10 cars behind, bearing down on me and wondering how good his brakes were.

Why can't we have appropriate rules and standards unique to each particular aspect of the hobby? If you want to build big copper boilers or tiny gauge 1 stuff, fine, but why not have an appropriate boiler code for that purpose, rather than trying to stuff it all in the current code and confusing everyone. If you need a standard for brakes at your club, fine, but why try to enforce that standard on everyone else.

At conventions we are seeing less of the smaller gauges. Does this mean that they aren't being built or do they not come because they do not enjoy running with the big models? Big is big and it doesn't matter how many 12 BA screws you used or left out. If it hits you the result is the same. It is also discouraging when you try to run your smaller

look on some of the dual gauge tracks only to find that you keep derailling at the points because of the wider clearances to accommodate bigger flanges. It's not their fault because there probably are no small models in their club (hence no small char) and they are unaware of the problem. They need wide flanges to safely haul bigger loads and besides, a narrow flange looks silly on a big model.

I like visiting other tracks and accept that there will be some where I can not run. That's the way it goes. If I'm lucky somebody will offer me a drive and if not, I will still enjoy watching. But if all the tracks were exactly the same, then as a whole I think the hobby will have lost something. Standardisation can go too far. Let's enjoy the differences and be more accepting of each other's points of view. I can see no reason why we can not be a united group of people who each express our hobby in our own particular way. If you want big, then go for it. If you want to build gauge 1 then that is good too. I don't always count rivets but I admire the people who do. I love 'em all, but stop trying to convince me that your particular point of view is the way to go and stop trying to tell me that we can all run on the same track at the same time as long as we use your wheel standards. This is supposed to be our hobby and it is supposed to be enjoyable, not a chore. Have fun.

Stephan Gaal (Victoria)

Large versus small

Congratulations to the Editor in taking the initiative to expose the issues surrounding large and small. Understanding these issues is essential for planning future facilities, management of safety hazards as well as ensuring that all the variations of the interest are made welcome and encouraged to belong. There is power in unity and allowing splinter groups to breakaway is not in anybody's best interests.

I am probably best known as a narrow gauge man. This is true in a sense, but my interests are not limited to narrow gauge. I have built in each of the 5, 7 1/4, and 12 inch gauges, done some freelancing, restored some big stuff, done a bit of steam boating, made rolling stock both standard and narrow gauge and right now I am working on a NSW prototype locomotive in 5 inch gauge.

To me, the sheer decadence of our hobby is that you do have absolute freedom to follow whatever takes your fancy! Common sense will tell you that certain commonality of gauge and construction standards is necessary for sharing facilities and so on, but really, when you think about it, the variety open to us as builders or purchasers is... well, what are the limits?

My view, one that is shared by many others, is that the adoption of such standards and codes of practice is the very thing that creates the freedoms that we are able to enjoy within our movement. A contradiction in terms maybe, freedom by regulation. But think about it: we have successfully kept external bureaucracy at arm's length so, with the possible exception of caring for public safety, we largely get to do our own thing, unsupervised. Never underestimate this freedom. Anyway, that subject is for another time. Back to the main line...

Life in the twenty first century is very much about confronting change. Nothing stays the same for too long. Whether business, personal or pleasure, the endeavours that survive are the ones that recognise change and adapt quickly to new situations. Stay ahead of game. If you do not, the game will pass you by and pretty soon you become irrelevant, obsolete and powerless to promote your cause.

Our hobby is experiencing a diversification of interests. There is increased opportunity for people to realise their dreams and greater expectations from those elusive leisure hours. All of this is healthy, necessary and to be encouraged. If we do not embrace these trends then we deserve to wither and die. Diversity is the spice of life!

So the issues of large vs small is not one of justification for counting rivets or despising the "fat old bastards" (to quote Ron May) the issues are: - How do we blend these vastly different preferences together in such a way that they are safe, enjoyable and mutually compatible. In other words, if *Blowflies* and 3 tonne Disneylanders must operate on the same track: do we need helmets? Seriously though, leaders in a club have a responsibility to manage this integration and ultimately, to have the good sense to ensure that people use the facilities in the manner intended even if that means setting limitations.

Likewise, it is satisfactory to allow new trends to impact on the activities enjoyed by a long established group that rightly has the expectation to continue their enjoyment? To refer to Ron May again, he states

"no 5" gauge to be seen on running days". I can't help wondering if there aren't any 5" gauges at all or is it that they deliberately stay away for fear of being Cobden Flyered on their day off? Clearly, new trends impact on existing activities. Leaders and participants alike must plan to merge the two things in a mutually beneficial way.

Ron May represents a legitimate demographic in the movement. He enjoys train driving, he enjoys entertaining the public and clearly, he has a functional approach to achieving this end. However, there are other legitimate demographics in the movement, Ron, ones involving research, exacting engineering skills and an interest in historical accuracy (see James Tennant). To those people, Ron, what hauls the train is everything and no one gives damn about who sits on the back! Preferably nobody! I would not dare to suggest that one was better than the other. The point of this discussion is simply "how do we cater for both?"

To further illustrate what I am saying, I make a non-specific reference based on true fact. A club of prototype modellers welcomes new members who are more attracted to larger sit-in-the-cab types. Without consideration to the needs of the existing membership they add another rail, grind out the check rails and frogs and allow the track alignment to go to pot because the main passenger haulers "don't have any trouble, it's only the scale stuff that falls off the track". Many people have sustained damage to their highly detailed equipment purely on account of untenable trackwork. Is it reasonable to expect those people to accept this state of affairs? Hotrod's and BMW's can live together provided engines aren't tuned in the night. You see what I'm saying? Vastly different interests can co-exist provided they don't adversely impact upon each other.

I think the large fraternity is blissfully unaware of their impact on the scale boys. I saw a thousand hours of work crushed in a few seconds by a large one once. My wagon was among the casualties. Wagons don't sue but they also don't "auto regenerate" either! Fear keeps people away!

I think there are genuine collision risks of running the large and small simultaneously. Clubs may consider running the two on different days or separate tracks or something like that. The point is, manage the problem. Be creative. Don't just expect happy members to compromise their fun.

I think there is an expectation that a Code of Practice can be stretched to include activities that were not really intended at the outset. Limitations must necessarily apply to the Scope and they should truly represent the "aims and objectives". If your aims and objectives are different then make your own arrangements.

Larger engines tend to create a false sense of security for the driver and the 10-km/h limit is easily exceeded. Braking is definitely impaired on the narrow rails commonly used with no possibility of grabbing the cab and planting your feet in an emergency. Similarly, the large engines suffer from reduced visibility and with small children around, I worry about a headstrong few spoiling it for the rest of us.

However, to conclude, I urge people to explore the issues of large vs small. People will do what people will do. Unity is essential to lobby our cause and generate public support. The face of Model Engineering is changing, diversifying, we must manage the situation sensibly and constructively. Likewise, to people looking for something different; don't inflict yourselves on others without considering the impact. Lastly, elected leaders: be bold enough to reject activities that your facilities were not intended to support. Specialize if necessary. Better to have one good thing than two not so good. Keep an open mind, stay vigilant and work with the problems. Good luck and free steaming!

Ross Bishop (New South Wales)

(I think the contributions from Murray, Stephan and Ross are as good a way as any to wrap up this discussion. When I first opened this forum it was because I have been hearing complaints everywhere I go, all centred around "large -v- small" issues. I did not expect the discussion to resolve the differences, but rather to help us all understand each other's viewpoint and in turn to make us more appreciative and tolerant of each other's particular interest. In that regard I hope we have succeeded. We need variety for the hobby to flourish — wouldn't it be boring if we all had exactly the same models. As Ross says "Diversity is the spice of life!" Thank you all for your comments and I hope that you will always enjoy your hobby. ... dp.)

Australian AModel Engineering

100 issues and 14 years of service to model engineering

In the beginning...

Australian Model Engineering magazine first appeared in October 1987, founded and produced by three colleagues, Editor Mark Whittaker, Associate Editor Gerardus Mol and Technical Editor Walter Shellshear. The magazine was, in essence, a development of the *Canberra Branch Line*, the club magazine of the Canberra Society of Model & Experimental Engineers which had grown in popularity over the years and circulated well beyond the confines of the Canberra club. It had become obvious to the founders that there

was a need for inter-club communication and an exchange of ideas within the model engineering community on this side of the world which the overseas magazines did not really cater for. Tentatively 500 copies of the first issue were printed and the response was so strong that the magazine immediately became a regular monthly publication and by May 1990 had doubled in size, although it was only available by subscription. It was at this time that the editor decided on a change of direction in his life and the magazine ceased production with issue 32.

That was not to be the end... AME had become too important to be allowed to die so a rescue mission was mounted by a very



The new look of AME after it was given a new lease of life with issue 33 and with Neil Graham at the helm. As well as a totally new style, the page size was increased to A4 and the magazine became available by means other than subscription only.

Halfway along the road was also a significant milestone. This was Brian C. as Editor.

The one which started it all! The very first issue of AME was a bold move which time has proven to be a good one.



determined team led by Neil Graham. The magazine was purchased and appeared in a totally new guise with issue 33 in November 1990. Page size was increased, typesetting was done 'in house' and AME was also made available through newsagents.

In 1993, Neil's occupation changed, meaning he no longer had the time to produce a magazine and Brian Carter took over as Managing Editor with issue 50 in September of that year. Brian introduced several layout changes, the most obvious being the introduction of the present cover design with issue 52.

Like Neil before him, the demands of Brian's real job changed and by 1997 he too was struggling to find the time to devote to putting a magazine together. The Managing Editorship then passed to David Proctor with issue 76. Since that time layout and styles have been further refined, and the change to all-electronic production with issue 83 vastly improved the appearance of AME.

Australian Model Engineering magazine has come a long way in 14 years and its success continues to grow!

The CL Class Diesel Electric Loco

An impressive machine from Clyde Engineering

Story and photos by Len Whalley

In 1970 my wife and I were in the last weeks of a six month trip around Australia. The trip had ignited a new interest in diesels after seeing the huge Alco Century C636 diesels rolling 20,000 ton ore trains out of the Pilbara to the coast in NW Western Australia. At the time the 3600hp C636's were "off the planet" compared with anything else on the government owned systems around the country where 1800 hp was the norm.

In November of that year, I was standing in the yard at Kalgoorlie when an almost new CL1 rolled in on a westbound freight. Then two hours later, CL3 arrived also heading west on a huge freight.

My big interest was in steam. However during the sixties, the clean lines, blue and yellow paint, and business like way the VR S class got stuck into moving the tonnage had impressed me. Up till then the VR S class would have got my vote as favourite diesel. But that first impression of the "big" CL was a lasting one. Two metres longer than an "S", and at 3000 hp, nearly double the horsepower! It still sported the familiar "bull nosed" front but with the modern 45 degree mansard roof that was then coming into vogue. Quite an impressive machine as diesels go!

The CLs (along with the WA "L class" which were almost identical internally) represented the start of a total new phase of diesel development on the government run systems. The upsurge of traffic that came with the opening of the standard gauge from Sydney to Perth made the CLs an instant success. Before long they were operating well beyond the Commonwealth Railway boundaries as the economies of through working were realised.

CL profile

The 17 CL locomotives were built by Clyde Engineering, Granville NSW in three batches during 1970-73. To meet stringent disproofing requirements, the Commonwealth Railways requested a full carbody. This enabled the use of a lighter truss outer framework and fibreglass side panels. The cab design was based on the GM class. As a class of locomotives, the CLs were the last streamlined cab GM diesels built under licence anywhere in the world. This design dated back to the North American FT units of 1939. The CLs were also the only complete



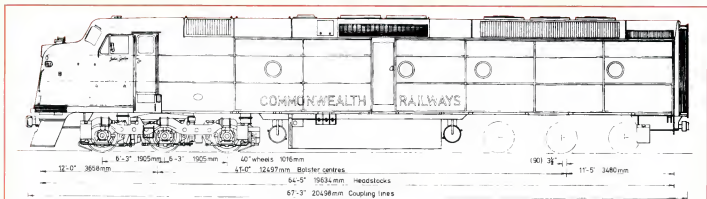
Commonwealth Railways CL3 brings a westbound freight into Kalgoorlie, Nov 1970.



CLPs 10 and 11, in classic back to back configuration, sweep into Broken Hill at the head of an eastbound Indian Pacific on 18 May 1997.

class of streamlined cab units left anywhere in the world. That record was shattered in February 1997 when CLP15 (originally the class leader CL1) was destroyed in the horrific head on crash of two freights at Morrison Hill on the Nullabor.

By the early ninties, all the CLs had clocked up millions of kilometres of cross continent running and were considered nearing the end of their economic life. In 1993 Morrison Knudsen of Whyalla SA negotiated a contract with Australian National to buy the class, rebuild them, and lease them back to AN on a "power-



Drawn by David Proctor

COMMONWEALTH RAILWAYS CL CLASS LOCOMOTIVE

From a drawing in Australasian Model Railroad Magazine, Issue 85



Appleton Dock, Melbourne, March 2000. CLP8 is in the Australian Southern Railways livery of orange and black, while CLP12 still sports the Australian national colours.

by-the-hour" basis. They were rebuilt into two groups, seven CLFs for freight operations, and 10 CLPs to be specially equipped for AN's crack passenger services, the *Indian Pacific* and *The Ghan*.

The rebuild would include body mounted sandboxes, improved cab with desktop control console and better air conditioning, a food storage refrigerator, new cab side windows and relocation of the battery boxes to the rear of the locomotive. The MK's microprocessor control system would maximise adhesion and carry out all loco control functions. The traction motors were exchanged for rebuilt ones known as D-78, which was an improved version of the EMD D-77 originally fitted.

The CLFs would have 60:17 gear ratio and the CLPs 59:18 giving top permissible speeds of 130km/hr and 140km/hr respectively.

In addition, the CLPs would be fitted with hydraulic yaw dampers to improve the ride at high speed. They would also carry twin Cummins-Onan self contained 125kW diesel alternator sets to provide train lighting/power/air-conditioning needs. These cut in and out automatically according to the power load requirements. The CLPs also carry 11,360L of fuel compared with the CLF 10,230L.

In the rebuild, only CL6 retained its original road number becoming CLF6. All the rest had their numbers changed

according to the order they were taken out of traffic and the date the rebuild was completed. CLF1 named *City of Whyalla* was issued to traffic on 29 June '93 and the last, CLF7 on 29 September '93. CLP8 appeared on 17 September '93 named *City of Port Augusta*. As '93 was the United Nations "Year of Indigenous People", all the remaining CLPs were named after Aboriginal tribal areas passed by AN trains as they cross the outback. They are CLP9 *Wiljakali*, CLP10 *Mirning*, CLP11 *Kaurana*, CLP12 *Ngadjuri*, CLP13 *Nukunu*, CLP14 *Barnagala*, CLP15 *Kokatha*, CLP16 *Murinitja* and CLP17 *Arabana* which was issued to traffic on 23 December '93.

In the rebuild, the CLFs retained the standard AN green colour scheme which they had carried for many years. However, the CLPs appeared in a very attractive silver body with green front end and a wide yellow band sweeping up from the front. This looked great with the stainless steel passenger cars. Being somewhat of a "vintage" locomotive they attracted quite a bit of attention from the railfan fraternity at the head of the nations crack passenger trains.

Ever since National Rail took over the 'hook and pull' function of passenger services with their new NR locos, the CLs have continued to tally up huge distances on freight services. The 16 remaining CLs of both varieties, still daily cross the nation for their new owner, Australian Southern Railways (ASR) in their striking, but what I think is a far less attractive, orange and black colour scheme.

CLP8 — The 5" Gauge Version

For someone who is working full time and has minimal time in the workshop, the building of a steam loco can take many years. I know. My first loco, a VR A2 4-6-0 took 12 years! However, with a 2-8-2 Baldwin on the way, I decided to put it aside for a while and build a diesel to have something to run. Who knows how long the steamer would take to finish! Hopefully with something to run, I would not be under pressure to rush the Baldwin and build in maintenance problems as I had done with my first loco. Maybe I would be able to build a diesel in 12 months and then get back to the steamer!

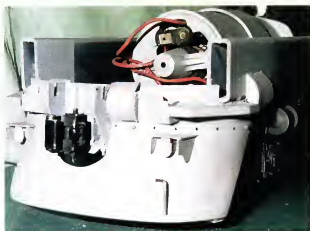
So what to build? I'm not at all inspired by the "square box shape" of a 422, but the construction series in *AME* and the basic innards seemed a good way to go. It didn't take long to decide on a CL, more particularly a CLP! The biggest challenge with any of these locos with rounded noses is to get the shape just right. However hard you may try, if you don't get the shape of the front just right, it will all look wrong. The colours may match the prototype, but the wrong shape will always make it look second rate. And

believe me, when you start looking closely, the nose on a VR "S class" is different from a GM, and a GM is different from a CL!

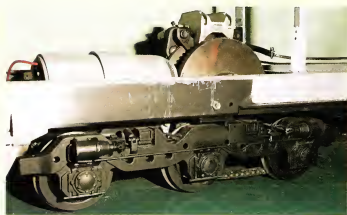
At this point I scored a real coup by acquiring a number of original drawings of a CL. They were one and a half inches to the foot. So a quick trip to the plan copiers and I had a beautiful drawing one inch to the foot exactly the scale I was building (and the drawing a little easier to handle.) The drawings that really helped were the bogie detail (which is almost identical to the G class castings offered through *AME*) and the body detail. Included was the cab plan, side and front elevation showing all the framing ribs that give the steel covering skin its distinctive shape. It's one thing through to have a drawing of the exact shape, but another thing to actually make it. More of that later.

Another advantage of

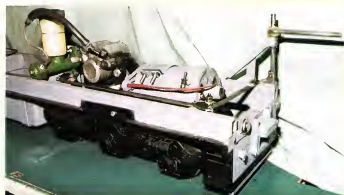
choosing a CLP (or CLF) was that every day one or two of them would roll into Melbourne late morning on the Patrick's container train. After shunting, the locos stable all afternoon before returning to Adelaide that evening. This gave me ample opportunity to take numerous detail photos and do any measurement checks. The crews were always cooperative and I was able to get inside shots of



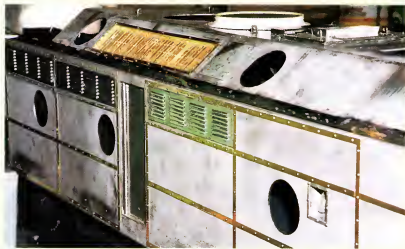
The front of the locomotive in the early days (April 2000)



Detail of one of the bogies



Rear bogie showing brake master cylinder, caliper and brake lever



Side detail with front roof hatch in position. Porthole rims and engine door handrails still to be fitted.

the cab detail and controls.

In planning the layout to get two 12v deep cycle batteries, two Lucas C-40 motors, plus all the electronics inside the one inch to the foot body, I came up with a major problem. I was rather



Start of cab section in position on the frame

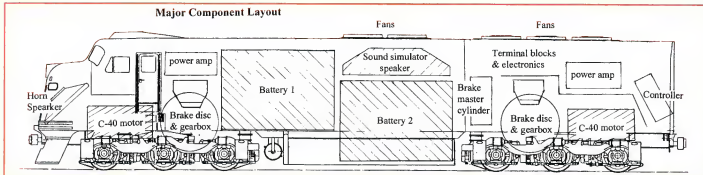
keen to steer away from the 422 idea of having the motors mounted low in the fuel tank space, i.e., the motor is fixed in the body and the chain drives onto a sprocket on the bogie axle that is pivoting. Another member of our club had used that idea and even though he had all the tension adjustments as in the 422 design, he still had numerous hassles with the chain drive either too tight or too loose and coming off. So I decided to mount the motors on the bogies. More problems! They were too wide to fit across the bogie and still give sufficient clearance. I also self-inflicted a further design problem by deciding that I didn't want the cab stuffed full of C-40 motor and electronics. I wanted the inside of the cab to look just like the real thing.

So I finished up with the one battery mounted really low as far back in the fuel tank space as possible, which really lowers the centre of gravity, and the other immediately in front of it. This also gave space above the second battery to mount the eight inch speaker box for the diesel sound simulator. (See diagram of component layout, below).

To get the motors mounted low enough and longitudinally, I finished up with a crown wheel and pinion arrangement to get the drive back onto an idler shaft and down via a chain drive to the axles. The theory was OK but in practice it was horribly noisy. This was later solved by installing a small commercially produced 5:1 gearbox from Pacific Sales. This has completely solved the problem and I am very pleased with the result. It means that I don't have chains or drive shafts or universals from the body to the pivoting bogies, only the power feed wires to the motor have to move. Each bogie has a separate switch for isolation and testing purposes.

The C-40 motors were rewound in series with heavier winding and have got quite a bit of grunt now that I have got the gear ratio sorted out at 5:1. Not being an electronics guru, I enlisted the help of friends to get the control circuit and the power amp all together and working. A major problem with the No 1 bogie was caused by the failure of the insulation under one of the 2N3055 transistors in the power

Major Component Layout





The cab with ribs and lights soldered in position

amplifier for this bogie. As a solution the diode D1 has been mounted on a separate heatsink insulated from the frame to avoid placing full voltage across the transistor insulation strips. Getting this and all the connections made correctly made an interesting problem to solve. Talk about a steep learning curve!

The first attempt at the frame using lightweight RHS was discarded when the welding pulled so much that I couldn't get it straight again! Attempt number two using heavier 50 x 20 x 3 RHS did the job. (I later used the bent frame for the riding car). The bogie sides were flame cut from 12mm plate. It took about four months to complete the two bogies with the motors mounted, and the basic loco frame.

The other design change with the bogies was with the brakes. When not powering there is a natural retardation of the wheels pushing over the gearboxes and the motors. This provides a quite reasonable slackening of speed and gliding to a stop without any brakes when the power is shut off. In fact it provides quite a bit of fun when driving the loco to judge when to cut off taking into account the grade, track speed, and load (passengers) to glide to a halt without using the brakes. However, disc brakes are provided by a 150mm x 5mm thick disc keyed to the idler shaft. This is gripped by the pads of a Kawasaki rear wheel motor bike brake assembly which was purchased from a motor bike wrecker, who assured me that this was the smallest type of assembly available. I later found that Go-Kart brakes are even smaller, but they are virtually impossible to get second hand and are very expensive new.

The body

The first decision with the body was whether to make the body and cab in one piece, or to split it. I eventually decided that access to certain areas could be made easier by making the roof hatches in two separate sections and the cab to be separate with the join at the rear of the cab door. The cab handrail covers the join very nicely. It also meant that the cab and nose section could be worked on much

easier at the bench without 1.6 metres of body attached!

The cab

Because of its malleable quality and ease of soldering, I decided to fabricate most of the cab out of copper. The cab door frames and the wide flat strip behind the ride over ribs (immediately above the coupler) were the first parts soldered together. The drawing showed that on the real CLs although the nose slopes back, the sides right from the cab doors around the front below the headlight are actually made of one sheet. So I traced, then cut out a cardboard template right off the drawing and it fitted in place perfectly. You need to be sure everything will fit well before you start cutting large sheets of copper! Now came the difficult bit; the curved top of the nose.

First I traced and cut out cardboard templates of all the ribs. Rather like rib sections of a boat hull. When I could see that it would all fit together, the templates were then marked out and carefully cut from copper sheet. One by one I soldered them into position starting from the one that goes across the full width just below the front windows. Then the headlight barrel, which is a piece of 38mm copper tube with a five degree slope down to the front. Then the centre rib which goes up between the windows, followed by the fan shape of ribs on each side. Finally the oval shaped tubes for the marker lights were soldered in. The cab was then turned upside down and a layer of fibreglass placed over all the ribs. When dry, it was turned up the correct way and a new mix of fibreglass poured in to fill the space between the ribs. This was



With the first layer of fibreglass applied

topped up with successive layers then sanded back until I finished up with a solid nose of fibreglass at least 15mm thick with the copper rib sections just



Finally, with fibreglass and body filler completed



The body is now well on the way and it is starting to look like a CLP

showing through. A final skim of auto filler putty and a sanding down and hey presto, the perfect shape. The roof was then hammered over of copper and soldered in. Inside roof and cab wall lining was added to conceal wiring to the cab lights, and the wires to the six inch speaker for the horn which is mounted inside the nose. The tiny hinges for the cab doors were a problem until I discovered a local dolls house supply shop! The cab section fits neatly over the main frame and is secured down in position with a bot and wingnut.

The side panels of the body are one piece of 1.5mm steel. Details like the size of the individual panel sections (indicated by .5mm brass cover strips), the porthole windows (identical to the 422 and most GM diesels) and position of the engine room door were pretty straight forward. However the CLP/CLFs had modifications with the addition of sandbox fillers, and extra vents. Photographs show that the position of the engine room vents along the top of the sides varied with different locos and also with the same loco! Obviously no standard position could be decided on for the best ventilation, so the vent panels went back on as decided by whoever was in charge of the fitters doing the overhaul. (At least no one can say you got it wrong!)

The panels on the No 2 end which



Cab interior with floor and rear wall removed. The gauges, switches and radios are coloured photos, reduced to scale size and glued in. The actual levers for brakes, reverser, horn, vigilance controls, etc. are made from pins with coloured plastic heads.



Cab floor and rear wall section complete with crew seats, refrigerator, foot rests, and wall-mounted computer

give access to the two generator sets on the real locos, were the logical ones to make removable to give access space to mount the control box. The controller is hard wired on a short lead and an be used mounted in the back of the loco, or mounted on the front of the riding car behind.

The controller

I decided that only the controls needed when travelling should be on the control box. So this included speed controller, dead mans handle (DMH), forward/reverse, headlight high/dim, horn, and amp metres for number 1 and 2 motors. All other switches for, headlight on/off, market lights white/read and front/rear, ditch lights, cab lights, ground lights, panel lights, sound, plus main on/off key switch which also activates the cooling fans, are beneath the controller. These are covered by the No 2 end panel when the loco is parked, or for exhibition purposes.

Details on the roof and the mansard sides are very obvious the way we usually view a model even if not so obvious in reality.

The size of grills and exhaust fans were carefully measured and details (and variations) examined on photographs. Fortunately, a row of 12V 100mm computer fans were just right and the surrounds are turned up from PVC plumbing fittings. They provide good cooling for the diodes on the heat sinks, and are mounted to draw the cool air in and force it down and are not exhaust fans as on the real thing. I didn't was to suck up all the dust from the track through the motors and electronic innards.

While talking of electronics, the diesel sound kit available from "Talking Electronics" referred to in AME issue 61, page 43 is a beauty. It really brings the model to life as it speeds up or slows down according to the position of the controller. The other item which I think really lets down many models is the horn. I definitely didn't want a single note Go-Kart "blaart" with a noisy 12v auto compressor. An electric car horn would also have been a simple solution, but would also sound just



No 2 end (cables were only temporary). Controller can be mounted as shown or on riding car or hand held. Handle upper right is for hydraulic brakes. Key switch in left hand MU socket position operates fans, lights and all 12v parts of circuit. The socket in the right hand MU socket carries a plug for lights on rear and in the tool box area of the riding car.



No 2 end "packed up" for exhibition purposes. The covers on the real loco give forklift access to remove the two generator sets for maintenance.

like that: a car horn! The real CLs have a beautiful five note Leslie model S-5t Super Typhon. After many fruitless leads I eventually decided on an electronics board which has a digital chip on which is recorded the real sound. With the speaker mounted in the nose and pointed down, the model really sounds authentic as the real CLs have horns mounted under the front below the draft gear.

The small detail like handrails, lights, rear view mirrors, and radio aerials, really make a difference to the finished result. Every effort was made to measure the full size or scale down off photographs to get



The author gives CLP8 a workout in his backyard

it right. Even the Pt Augusta Shire crest plate which is carried below the name on CLP8 was photographed and photo-etched as was the Morrison Knudsen builders plate which is carried low on the nose drivers side only.

The detail inside the cab presented its own problems! Where do you draw the line with detail? During the CLs previous rebuild in '93, the cab floor was raised nine inches and now goes right across (previously there was a separate raised platform on each side). The rebuild necessitated the raised bump in the cab roof to give headroom clearance which standing in the middle of the cab. I used this recess to conceal the two 12v cab lights which are diffused by thin translucent perspex.

The cab rear wall and floor complete with seats, the foot rests is separate, and slides into a slot in the nose unit under the control desk. This made it a lot easier to

make and mount the cab detail, but also gives access to the nose to change light globes. The control desk is made of stainless steel with coloured photos of the gauges and radios glued in place. Throttle, reverser, brake, vigilance control, and horn levers were all made from push pins with the correct colour plastic tops.

Riding car

The riding car is an Australian National HM stainless steel van, and stores the driver's seat, battery charger and tool box. The tail lights and a light in the tool storage area all plug through from the loco. How to represent the fluted stainless steel sections on the sides and roof presented a problem for many months. Eventually I discovered a material called Structure Line, Wave 1, Silver PF. It is a 1mm thick, black, high impact polystyrene extremely durable silver coating, available from Tesrol in Heidelberg West in Victoria. Tesrol have offices in all states of Australia and New Zealand. It is quite expensive but the pitch of the waves is just right to give a fair representation of the real thing.

If you are wondering if I am now



An evening run on the author's private track

going to embark on building a set of *Indian Pacific* or *Ghan* carriages, the answer is no. However, I have just completed a set of bogie flat wagons that will carry shipping containers which will double as passenger seats. A container freight train is more representative of the CLs role today.

I am really pleased with the result and trust there are some ideas other can use. For now, back to the Baldwin.



Some of the bogie detail, the air reservoir and the fuel gauge



Note the driver's control desk is illuminated by the cab lights



The excellent finish is evident in this view of the right hand side of the cab

The Ascot Locomotive Society

By Nalder Stephens with input from Derek Alford

The Ascot Locomotive Society now faces the traumatic experience, probably late in 2002 of lifting their entire railway system and buildings which lie inside the Ascot Racecourse adjacent to the Straight Mile section of the racetrack and overlooked by the grandstand. Last year the Racecourse Authority announced plans to redevelop the grandstand and re-align the racecourse in that area. The magnitude of the work and planning involved of moving a railway with thirty two turnouts, a diamond crossing, two turntables, one 16ft 6in in diameter, signal box with fully automated points and signals, a scale Victorian warehouse to house the engines and kitchen together with other buildings and some 4,500 feet of track cannot be under estimated. Unfortunately the station layout is too complicated to be able to illustrate here.

Assistance in kind has been offered by the Racecourse Authority who, we understand, will be rebuilding the clubhouse/engine shed, etc., and supplying the wherewithal to landscape and grade the track. Detailed designs have been developed for the new railway over

the past nine months and the full planning application has already been submitted to the Royal Borough of Windsor and Maidenhead. At this time the original target to vacate the railway site in 2002 is probably premature. The Society may get a stay of execution until after the Royal Ascot Meeting in June 2002, which is a special year, being the Queen's Golden Jubilee Year. In the meantime members and visiting clubs are being urged to make as much use of the railway as possible before we lose it.

The relocation site is way over the other side of the coach parking area No. 10 and there it becomes possible to put a continuous circuit, which the existing railway does not have — although it does have a closed loop of 925ft. The new circuit will have minimum 60ft radius curves each end. The western loop end is to be on relatively open ground, but the other will run through a copse of mature sweet chestnut trees, some having trunks 2 metres in diameter, they are no doubt survivors of the ancient Windsor Forest. Undulating ground joins the two loops needing, it is estimated, 1,000 cubic metres

of soil to be moved and landscaped elsewhere to provide for cuttings and embankments up to 2 metres deep and 1 metre high. In addition to the sweet chestnut trees there are a number of mature oaks which will necessitate several direction changes. The run promises to be both highly scenic and very interesting to drive as it will be some 3,500 feet in length. The gradients will be in the order of 1 in 60, but this time there will be four separate summits to negotiate instead of the existing single one.

The membership has decided not only to build a terminus as good or better than the existing one described later but also a through station on the western loop, each with its own freight yard and turntable. These facilities should provide the 5 inch gauge Mainline Association with a great opportunity to operate prototypically during their annual visits to Ascot. They specialise in complex and difficult shunting competitions for which the new railway will be ideally suited.

The history of the Ascot Locomotive Society is very interesting. Originally based alongside the sports field at Heatherdown



A 7 1/4" gauge BR Class 9 2-10-0, Evening Star, one of two built by Ron Martin of Bristol from official British Rail drawings, this one is owned by Phillip Bellamy (resident in Switzerland). It was exhibited at the SMEE Centenary Exhibition in 1998. Photo: Nalder Stephens (Durban SME)

School, Ascot, a private preparatory school attended by Princes Andrew and Edward, the railway consisted of an out and back track with a small enclosed loop, a station with twelve turnouts fully controlled and signalled, the 16ft gins turntable mentioned above and some converted garden buildings. It was a private club with some 20 members, the public were not admitted, as is still the case at the Racecourse, but visiting clubs were welcome.

When the school was sold to the Licensed Victuallers Association with a view to a new much larger school being built, the railway had to be lifted and stored for some two or three years. After a great deal of work trying to find a new site and the club being split about whether or not the public should have access to and support the new railway, two new clubs came into being. The one, now designated the Ascot Locomotive Society was offered a site inside the Racecourse for a private club. As this is the Royal Racecourse it was rather like receiving an offer to build a railway around St. Pauls Cathedral! It was an incredible achievement after much persistence by the founder of ALS, Derek Alford. The other half of the original club with half the track and turnouts, was offered a site in a public park at Frimley near Farnborough, Surrey by the local council. They, in spite of commitments to the Council and public, have prospered and have an extensive and profitable railway through the pine trees alongside the Basingstoke Canal, calling

themselves The Frimley and Ascot Locomotive Club.

The Ascot Locomotive Society itself was founded in 1988 having received the offer from the Racecourse Authority, building their railway between the Straight Mile, on a 20 metre wide strip and No. 10 Coach park with some screening by trees and shrubs between the railway and the coach park. The triple gauge track construction by the two clubs is similar. At Ascot the 1,600 feet of track from Heatherdown was extended to 4,396 feet including the turnouts, turntables, etc., mentioned above. The terminus is well endowed with a six road station at the end of which is the 5 metre turntable with 19 roads radiating from it, eight for the loco shed, six for the station, with the remainder for the sidings and the steaming bays via the elevating traverser.

A signal box and a 32 lever frame were constructed at the throat of the station to control 15 turnouts manually by rodding, the remaining 17 levers controlling a forest of semaphore and electric shunting signals protecting the terminus junction and adjacent sidings.

Visibility on the main line and the 120 feet radius loop is more than adequate for drivers to maintain a safe distance by visual observation, which is potentially more reliable than relying on track sectioning signalling which cannot easily detect a split train. The all welded track construction does not permit continuous track circuit monitoring.

Economy of track construction was paramount when the first railway was built in 1977 by Derek Alford, E.Eng.MI.Mech.E., the present Mechanical Engineer and Founder, Secretary and Engineer of the original club. He devised an all welded track and turnouts, jig built, using 20 x 10mm black iron for the 7 1/4" g. rails spaced at 7.5 in. intervals by 10mm squares on top of which were welded two 10mm square rails for the lower axle loading of the 5 and 3 1/2" gauges.

One single bolthole fishplate was welded at each end of each length of track to engage holes drilled to match in the adjoining length. The fixing bolts are not dead tight, lock nuts are used to enable the track to expand and contract with varying ambient temperature. The track is secured by nails through holes drilled in the cross members to softwood sleepers spaced 7 1/2" apart which are embedded in 40mm of limestone chippings. This construction ensures a very rigid track, the condition of the treated wooden sleepers of no great consequences, nor is the condition of the roadbed. Each time the track has been or will be lifted the sleepers will be re-lifted or replaced as necessary.

You can be sure that with all the experience they have acquired, and an extended membership with additional expertise, the new railway will be a great success and very popular with the M.E. fraternity.



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#60	May-June	1995	\$6.05
#61	July-August	1995	\$6.05
#62	Sept-Oct	1995	\$6.05
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Bunyip



A Bundaberg Fowler 0-6-2T in 7 1/4" gauge — part 22

by Ian Smith

Drawings and photos by the author unless credited otherwise

Sand domes

The sand domes are machined from a casting and are machined similarly to the smokestack. Set up in the four jaw chuck and face the top till it measures about 116mm high and turn the outside diameter to 173mm diameter x 14mm long (Photo 1). Reverse in the chuck, set the dome to run true to the machined face and take a facing cut across the end to give you a reference when machining the radius. With a boring tool, take a cleanup cut in the bore about 5mm deep (this so you can find the centre of the dome). Set up the dome on the milling table on the face you have just machined and clamp to the table with two bolts and two solid pieces of steel. Around the machined outside diameter face of the dome clamp three or four stops to the table and hard up against the machined face so you can set the next dome up to the boring head. Now set the two bosses on the sides of the dome so they are parallel to the table travel

(Photo 2). With a dial indicator clamped the boring head, centre the dome to the boring head. Replace the indicator with a boring bar and set the radius of 174mm the same way as you did for machining the smoke stack, rotate the milling head 90°, set the boring bar up till it is touching the casting and take a light cut. Keep taking cuts until the face cleans up and you have machined it to 115mm from the table. Before removing the dome from the milling table check where the boiler band will sit under the dome when mounted on the boiler and take some more cuts so the width of boiler band will not hold the dome away from the wrapper. It only happens on one dome (Photo 3). Lock the boring bar in the vertical position with the cutting edge down and just touching the machined face, scribe a line along the face by winding the table along. You will use that line when setting up to machine the side bosses. If you have a rotary table or a large dividing head set the dome up to run true then

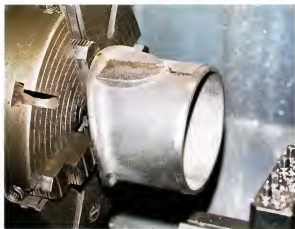


Photo 1

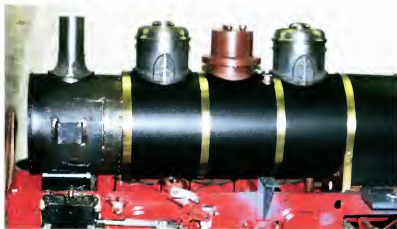


Photo 3



Photo 2



Photo 4



Photo 5

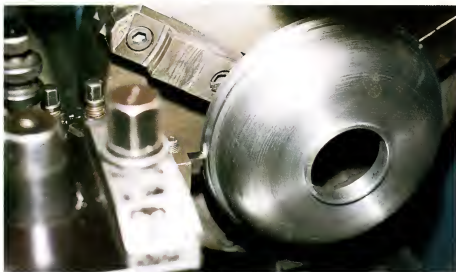


Photo 6



Photo 7

chuck out of 31mm wide x 12mm thick x 37mm long MS plate. Offset the piece 31mm and in the centre of the plate, centre and drill and ream 8mm dia. and turn a boss 12mm diameter x 7mm long. Set up valve slide in the three jaw chuck holding by the 12mm diameter and turn the 31mm radius. Mark out the shape of the valve and finish to size. Set up the valve assembly with the slide and valve and the activating arm parallel to each other and drill for 2mm dia. roll pins. The other slide has a 2mm wide slot in it so the spring will keep the tension on both slides. Slide a piece of 8mm ID pipe on the rod and an 8mm washer and spring, another 8mm washer, fit a 2mm dia. x 12mm long roll pin then slide valve then the valve then bolt together. Try the movement of the valve. Mark out and drill the two mounting holes and drill 8mm. If you want to use the sand domes to sand the rail you will need to make a sheet metal cover to cover the bottom of the sand box and follow the shape of the casting and seal the outer edges.

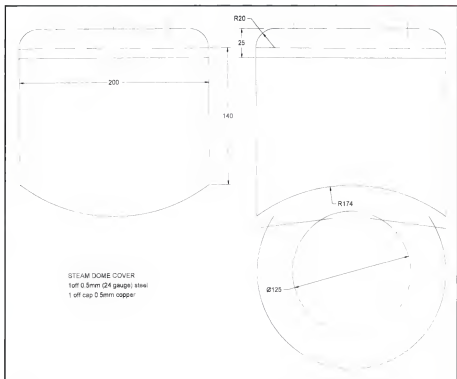
Set the sand dome top up in the four jaw chuck till the outside runs true and bore out the counter bore to 173mm dia. + 0.2mm for a free fit (Photo 4). Take a cleanup cut across the outside, reverse in the chuck and turn the outside to 191.5mm dia. x

14.5mm wide. Bore the hole in the top to 60mm and the outside to 66mm dia. Using the cross slide and the compound slide free hand, turn the outside face of the top till the casting cleans up and set up a hand turning rest in the tool holder and using a hand scraper clean up any ridges on the outside of the top (Photo 5). Now the 66mm diameter can be turned to length of 5mm. Turn a set on both sides of the 191.5mm dia. to 183.5mm dia. x 3.25mm wide which should leave an 8mm wide x 4mm deep step. Using a 4mm-radius turning tool turn the 8mm wide bead, break all sharp edges (Photos 6 and 7). The cap for the top is turned in a similar way to the top. Do not try to use a scraper on the cap as it will get caught in the recess. The centre boss is drilled and tapped M4 to take a chain which prevents the cap from getting lost. The two pipes that come off the bottom of the valve on the sand dome are 8mm ID x 10mm outside. They come straight down the boiler and inside the frames and either side of the driving wheels to about 12mm off the rail. The edge nearest to the wheel is cut off on an angle. The front sand dome setup goes around the leading coupled wheels.

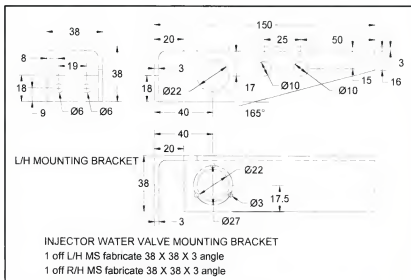
Steam dome cover

The steam dome is cut from 0.5mm sheet, the same as the boiler cladding. Generate the profile of the base of dome and mark out on the sheet, make the join at the back of the dome and allow a 25mm overlap of the ends. Check the diameter of the steam dome flange 200mm diameter, and cut to shape. Wrap the sheet around the flange and mark the overlap so the ends can be either spot-welded or soft soldered together.

The steam dome top is spun out of 0.5mm copper. Turn up a former to the shape of the top. Cut out a disk of copper and sandwich the disc of copper between the former and 120mm dia. plate and using the tail stock and a revolving centre, apply pressure to the sandwich so the disk will not slip when trying to spin the top. Use a solid flat bar with a 10mm diameter peg pressed into it for the hand forming tool to pivot on. This is held in the tool holder in the lathe with the forming tool against the copper disk. The forming tool has a ball turned on the end and polished and a long handle for leverage. Apply pressure to the face of the copper disk and work the forming tool around the former till you have the right shape. Trim the cap to size; be careful when removing the cap as it might be stuck to the former. Assemble the dome and fit to the steam dome with some



bodies are turned out of 32mm diameter brass. Set up in the three jaw chuck and turn down to 12.7mm dia. x 10mm long and using the tail stock die holder thread the end $1\frac{1}{2}" \times 26$, centre and drill 6.5mm dia. x 45mm deep. With a large centre drill open out the start of the hole to 9.5mm diameter. Turn down to 20mm dia. x 25mm long. Before parting off mark, out the 12.7mm dia. hole 12mm in from the step and drill through the centre of the 20mm diameter, return to the lathe and part off 45mm long over all. Take a piece of 12.7mm dia. brass rod or turn down a piece of brass rod to 12.7mm and thread the end $1\frac{1}{2}" \times 26 \times 10$ mm long. Centre and drill 6.5mm dia. 40mm deep and open out with a centre drill to 9.5mm dia., part off 40mm long, reverse in the chuck and thread the end the same and centre drill to 9.5mm dia. Clean and flux both pieces and set the 12.7mm dia. rod central and silver solder together. Set up in the three jaw chuck and drill through with a 6.5mm drill, open out to 11mm and flat bottom drill to 32mm deep. Bore to 12mm dia. and run the cut in a few times to take out any taper and counter bore to 14.9mm dia. x 9.5mm deep. Using the tail stock, tap $1\frac{1}{2}" \times 26 \times 9.5$ mm deep. Repeat on the other body. The reason for the two side entries is so you can take water either from the side tanks or from your driving truck.



The two boiler feed check valves are turned out of 12.7mm brass hexagon. Put the hexagon bar in the three-jaw chuck and face and part off 19mm long. Centre and drill 10mm dia. and tap $\frac{7}{16} \times 26$ using the tailstock. Turn the two ends turn down to 11.1mm dia. \times 6.5mm long and cut a $\frac{7}{16} \times 26$ thread with the tail stock die holder. Centre and drill and ream 6mm \times 20mm long for the ball seat and part off 19mm long. Make four. Using a screwed bush $\frac{7}{16} \times 26$ in the chuck, screw in the end piece and machine the same $\frac{7}{16} \times 26 \times 7.5$ mm long and open out the 6mm hole with a centre drill to 9.5mm diameter. In one of the end pieces cut six slots with a hacksaw about 2.5mm deep to let the water travel through when the ball lifts off its seat so it cannot seal and not let any water through the valve. Assemble the valve with an 8mm dia. non corrosive ball in it. There should be 0.6 - 0.7mm lift in the ball. Make nut and tails for 8mm diameter copper pipe, mark the outside of the check valve body to indicate the direction of water travel.

The Okadee valves are made of brass. Put a piece of 19mm dia. brass bar in the three-jaw chuck and turn down to 11mm dia. x 6mm long. Using the tail stock die holder, thread $7/16" \times 26$ and part off 25 mm long. With a piece of 12.7mm hexagon brass bar in the three jaw turn down to 8mm dia. and thread M8, centre and drill 3.5mm dia. x 10mm deep and part off 15mm long. Reverse in the chuck and turn a 3.5mm dia. x 1mm long for a locating peg. Put the hexagon bar back in the chuck and centre and drill 10mm dia. x 16mm deep and tap $7/16" \times 26$. Part off 26.5mm long, reverse in the chuck and turn down to 11mm dia. x 7.5mm long and thread $7/16" \times 26$. Centre and drill 5mm and with a large centre open to 8mm diameter. The piston is made out of Teflon. Put a piece of Teflon in the three jaw and turn down to 9.7mm diameter and part off 9mm long.

To be concluded...



A Garratt Gossip Special!

The first point is that it is very easy to get 'roped' in to write these reports, but this one is rather special. John Cummings made the request for this and anyone that knows the likeable 'rogue' will then realise it involves Beyer Garratts.

However, as a member of the 2 1/2" gauge society what the devil am I playing at going to a 7 1/4" Society meeting! Because I have built three Garratts with a fourth one part finished I was the only person who had such a collection of these engines in the U.K. The organiser of the event, Bert Whalley requested I put some of my engines on 'display' alongside the engines that the 7 1/4" Society would be running on the weekend. Other enthusiasts were also asked to help in the same way and John May turned up with his recently finished 5" gauge NSW AD60 and Colin Gaytor brought a 5" gauge front end chassis off his EAR '59' Class engine. The event itself was to have been purely a Beyer Peacock weekend but this was cancelled because of the Foot and Mouth crisis and Weston Park was grazing land for a lot of sheep. The revised event, some 12 weeks later than originally planned, 'incorporated' with the BP weekend, was a 7 1/4" Narrow Gauge prototype meeting. This gave a wider access to the event and more motive power available in case of engine failure! It can

Garratts at Weston Park

A British 7 1/4" Gauge Weekend

By Peter Wardle



No 5928 Mount Kilimanjaro on the steaming bay

happen.

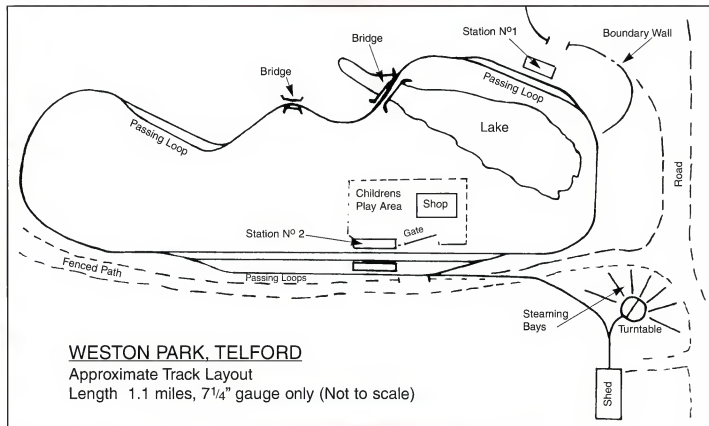
The track

I requested track plans from the organiser but they were not forthcoming. I have therefore made an approximate sketch for this report. The length of the track is 1 1/10 miles (1.76k) and it is purely 7 1/4" gauge ground level throughout. By means of single line working and the use of token exchanges and passing loops it was 'demonstrated' that working could be in clockwise and anticlockwise directions at the same time. The turntable at the engine

shed was used to determine whether an engine went onto the main line 'chimney first' or 'tender first', which then determined in which direction the loco would be running on the main line. The turntable has been rebuilt to accommodate 20' long engines.

The shed

This was about 160ft long by 80ft wide and in effect was a 'covered' siding with about 10 'spur tracks' inside. At the far end was a workshop facility with the usual metal and wood working tackle, with a





This view of both Garratts on the steaming bays shows the bunker end of Mount Kenya



Here we have a bunker end view of Mount Kilimanjaro on the turntable



John May's prototypically plain black 5" NSWGR AD60 class Garratt looks very nice



The benefits of articulation are very obvious on this curve

7 1/4" gauge SAR 15 ft chassis in the construction stage whilst it's finished but unpainted tender was at the other end of the shop. An electric loco in CN livery (Canadian National) sat there 'on charge' with 6 passenger carrying coaches at the rear. Watering/cleaning and firing facilities were available for the proper engines of character (all steamers)

Obviously the shed would not be viable without its tea and coffee system and one small cooking oven which it has at the front of the shed.

The engines (we had all come to see)

Two 7 1/4" gauge EAR Class 59 Beyer Garratts both professionally built by Neil Simpkins and later by a joint venture Coleby-Simpkins.

Technical details basically vary only in the method of firing — one uses coal the other oil firing. Each loco is 20ft long weighs 2 tons — wheelbase 4-8-2+2-8-4, boiler dia. 15", working pressure 125 psi, smokebox 17" dia. 39 flue tubes, 4 super-heater tubes, wheel dia. 10", cylinder bore 3 3/4" x 5 1/2" stroke, full width 22", height 33" approx.

Now these two monsters have quite a history and to separate them they are:-

N°5901 MOUNT KENYA — builders Coleby-Simpkins (Oil Fired)

This engine was built for a customer who found he could not pay for it. It now belongs to the National Railway Museum, York and is on loan to Weston Park until September 2001 on the basis that it is restored to working order and returned to the Museum in that state. On this particular point, the oil firing was not functioning correctly on this weekend. It was too severe and could not be cut back sufficiently to stop the over-production of steam (i.e. blowing at safety valves). For this reason this engine was always leading engine when double heading.

The theory of this being, that if the engine ran out of steam, locomotive N°5928 **MOUNT KILIMANJARO** would be able to not only push the leading loco but also pull its load of fare-paying passengers at the same time. This situation fortunately did not occur but 5901 needed much more time at the waterhole than 5928. Browse again at the photos — yes 5928 towed an 8'6" long water bowser before it attached its first passenger carrying vehicle, double heading the total length of the motive power units to 48'6".

Back to 5928 for a minute. This engine is coal fired. Originally built about 21 years ago for Brian Hollingsworth who, by arrangement with its new custodian, Mr. Brett Rogers of Lichfield has allowed the engine into public use, having previously been for private use only. The builder of this engine, Neil Simpkins was on hand and drove the engine on the Saturday of the event as the 2nd engine, whilst John Coleby drove the lead engine 5901 at the same time. Both drivers had not seen these engines for about 16 years prior to this event. I have since heard that 5901 has had its oil firing system completely rebuilt and it now functions much better and is easier to drive.

Other notable people viewing this spectacle of power were Mike Crisp, Editor of *Model Engineer*, Trevor Sirland owner of the Beyer Peacock Co title for use with his engineering concern in the Exmoor region (U.K.) (Note old firms of quality never die.)

On the Sunday of the event only one

Garratt (No.5928) initially appeared from the shed because the other one had slight lubricator problems and a piston gland that had unwound and shed its packing — all was at hand for rapid repairs and both engines eventually met and were re-united as double headers later in the day. To be fair, other engines were running and although pre-occupied with the Garratts and my liking for them, there are a couple of photos of other engines present. In particular the locomotive No.25 SR&RL was superb and did a lot of passenger hauling. In the bays are pictured *Asterix* and *Romulus* and inside the shed is the CN electric locomotive.

Originally, I was told I might get a driving session on a Garratt but when I realised just what awesome power was in these machines I am glad I didn't drive the engines. Years ago *Mount Kilimanjaro* was 'put to the test' and hauled 130 passengers and two dogs (they ran out of passenger carrying vehicles). That's not all — at the time the loco had 35 psi showing on the gauges! At Weston Park they could not safely load it to that extent — for two main reasons a 'short' train was the order of the day, (a) the 'tail' of a long train could not be seen by the driver if it derailed and (b) the passing loops could not accommodate a train, shall we say of exceptional length.

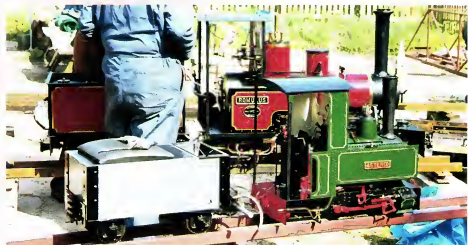
Having said all that, the track area at Weston Park is fairly easy to find once inside the park. Bert Whalley is in charge of the project as a commercial venture. The idea is to carry passengers on a daily basis during the season - April to October. Once in the Park there are facilities such as a coffee house, restaurant and bar close at hand to the railway. A gift shop can be found in the stables, again close by. If needed a children's playground is actually inside the perimeter of the railway. The Weston Hall residence is seasonally opened to visitors and conference meetings and is generally in a beautiful setting, not forgetting that is 8 miles (approx. 13k) south of Telford whilst about 4 miles (6.5k) north there is the Ironbridge Museum and the world first all cast iron bridge.

At the end of the day, with coffee in hand, it was interesting to chat to various people. *Model Engineer* editor, Mike Crisp asked me if I would be building a 7 1/4" Garratt. My reply was "No, I could not afford the transport to move it around". I then asked him "When does a model cease to be a model?" His answer - "It can be 1/10th scale or 10 x F.S. scale, but it is still a model. However, once built for commercial intentions then the 'model' is in a class of its own and should be treated as such".

One other thing causing concern in this case was the materials used in boiler construction. Now I know that full size engines had coppered steel for boiler plates - this no longer is available. A lot of preservation societies in the UK are having premature boiler failures because of this.



Another look at the magnificent Mount Kenya on the steaming bay



Romulus and Asterix, just to prove it wasn't all Garratts!



Has live steam in the UK really gone to the dogs or is this the cream of British loco drivers?

Example — a new boiler firebase inner, expected to last 10 years, failed after 3 years (Savern Valley Railway).

I am glad my 2 1/2" engines have copper boilers because the larger model with steel ones tend to have a much more limited life than expected!

Finally a very special engine, type not known, but it had two driving dogs, one operating the RH motion and the other the

LH motion in perfect harmony (see photo). If you believe this, then you will realise that here in England we are as mad (if not worse) than our brothers in the Australian model engineering fraternity.

(Peter Wardle, as well as being a regular correspondent with John Cummings, is a former apprentice of Beyer Peacock.)



Club Roundup



compiled by David Proctor

Adelaide SA

In August another sizeable chunk of track was built on the end of the head-shunt. Thanks to John Lys for the donation of track panels no longer required, thus speeding up the eventual completion of Railway Park's "High Line".

The August field day was poorly patronised by both the public and strangely enough by motive power, but on the plus side, plenty of spare members were on hand which allowed us to complete the new "High Line" branch. Completion took place late in the day and the welder had only been removed when five seconds later the *Blue Blurr* flashed over the still hot joint. A good job by all concerned. The "High Line" though not intended for passenger traffic and should make play-days more interesting.

Adelaide Miniature Steam Railway Society Inc.

Location: 370 Regency Road, Prospect
Public Running: 4th Sunday

Bulla Vic

The diversion of the 7 $\frac{1}{4}$ - 5 inch track around the station area is complete so that running can continue on Public Run Days. A grant has been secured from Parks Victoria which is to be spent on the BBQ area. A permit will be arranged to cover the construction of shelters in the area where the grant has to be spent.

The small track construction team are making good progress. The idea of welding one rail only to the curves and then using the track gauges and wedges to assemble the two other rails and provide super-elevation at the time of welding is working out well. At the same time work on the ballasting and replacing all the old sleepers is well under way. Machining has also started on the point frog sections and the assembly of the point sets can be undertaken if we strike wet weather.

Tullamarine Live Steam Society

Location: 15 Green Street, Bulla
Public Running: 1st & 3rd Sundays
<http://www.netlink.com.au/~rbritt/bullahill.html>

Burnaby, BC Canada

With only two weeks left in this, our ninth running season at this site, we will easily eclipse our best season for passengers — with over 30,000 passengers this

year well within sight, we will have passed last year's total by more than 10%.

The last weeks of the year also mean a busy time ahead. Also coming up is our final public event of the year at the track. Our annual Halloween Run in the Dark has come to be a major public relations event for the community and even on rainy nights in the past, we have entertained large crowds. The event started as a place for kids to come after trick or treating, and has become in a few short years, an attraction for old and young alike. It is not unrealistic to expect in excess of 800 guests this year, rain or not. It will be but two weeks later that we will be setting up for our fourth Christmas run at Loughheed Mall. This also has turned out to be a winner.

The efforts of several younger members of the club cannot go without notice. The effort put in by three of them to put our beloved club Hudson back into as new condition after its untimely breakdown this summer, has given new meaning to selfless sacrifice for the club. These three fellows have stripped it down to the bones and built it back up in good running order in the matter of a month or so. With all new bearings and a fresh coat of paint, it should be the lead locomotive for several years to come.

British Columbia Soc. of Model Engrs

Location: Rainbow Creek Station, 120 Nih Willington Ave, Burnaby, BC.

Public Running: Saturday, Sunday & public holidays, Easter to Thanksgiving

Darwin NT

(A note received from Rod Wheeler). At long last I've finally got together a group of model engineers in Darwin. We had our first meeting on September 10, with 17 interested and keen enthusiasts, (an additional two were unable to attend). It was held in the old QANTAS Hanger, McDonald Street, Parap, courtesy of the Motor Vehicle Enthusiasts Club and Museum - Industrial Antiques (Leo Izod).

The group has settled on "Northern Territory Model & Experimental Engineering Group" for a title. We hope to include any other interested model engineers residing in the Territory.

Future meetings are to be held on the fourth Wednesday of the month at the old

QANTAS Hanger. The group has a broad coverage of model engineering interests and all areas of the hobby are welcome.

I can be contacted by phone/fax on (08) 8948 4520 or by mail to at PO Box 877, Nightcliff, NT 0814, or by e-mail on:

RodW@bigpond.com

(Congratulations to Rod and his fellow model engineers in the Territory. We look forward to further progress reports ... Ed.)

Christchurch NZ

Members have been looking at the preferred type of pond and layout should the move to the Showgrounds go ahead. The aim is to have the trains and boats all together at one spot. The pond should be oval with the sides sloping up slightly to the edges and a clay bottom, the inner harbour to have an offset breakwater protecting the harbour which will have squared concrete edges with berthing fingers projecting out, similar to our existing pond.

Twenty club trolley bogies are presently under construction by Graham McIlroy to a modified David Giles design.

The first birthday party of the season was held in August and also the commissioning of the club loco *Frank Curry*. Frank's family were there for the ceremony and took the first ride around the track. Alan Orwin reported on the development of the GLT project to date. About \$12,000 worth of steel and 3000 wooden sleepers have been donated.

Canterbury Soc of Model & Experimental Engineers

Location: 26 Andrews Cres, Christchurch
Public Running: 1st & 3rd Sundays
www.rcmodels.com/clubs/csmee/index.html

Eltham Vic

Meadmore Platform concreting works were completed in September and it is intended to install wire mesh fencing and two gates so that the Jack Tatum Memorial Reserve can be reopened for the Christmas Season. The next stage of the fencing of Diamond Valley station is now complete along with new concrete around the front of the station. The old Meadmore Junction platform has been demolished and converted to a mound, which has been planted with shrubs. The windows in Meadmore Junction signal box have been modified and the new platform road at Meadmore Junction is now complete.

Track re-arrangements at the arrival end of Meadmore Junction are now complete. The spare 60' radius left hand points were removed and the last was re-furbished as a right hand point to replace the 100' radius right hand point and share reverse curve near Meadmore Junction signal box.

The Work for the Dole team has been involved in projects such as extended the old Nillumbik goods platform, installing a new goods platform alongside a new siding adjacent to Rutledge Loop and increasing the capacity of the char bin.

The first 12 track panels have been

prepared for the re-furbishment of the Pinetree Loop line between the level crossing at Meadmore Junction Signal Box and the exit of ROCLA tunnel. These track panels are constructed from the new 6 kg/m rail and plastic sleepers.

Diamond Valley Railway Inc

Location: Eltham Lower Park, Main Rd, Eltham

Public Running: Every Sun & pub. hol.

<http://www.railpage.org.au/dvr>

Evandale Tas

In the past few weeks ELRSS has been very active and hosted the HRCOA during the AGM weekend in Launceston and the British Railway Models of Australia. Work is continuing for the forthcoming convention and the club expects to be quite busy over the Christmas/New Year period completing the track extensions and new loco shed as well as the work on Waddle Junction, which we hope to complete by the convention. The Council have connected the site to the town water supply so we no longer rely on the generosity of Jill Waddle for our water. Approval has been given by the Council to run a generator to supply power for the site during the convention as the present connection is not capable of supplying the required capacity. Any persons requiring to set up a trade stall at the convention should contact Peter Lawson so that space can be arranged.

It is with regret that we record the passing of Greg Waddle on October 11. When Greg passed away his loss was felt across the state and nearly 1000 people paid their final respects. In miniature and model railway circles, radio controlled planes, gliders and r/c boats, Greg was a talented builder and operator. He was also an outstanding artist and teacher. Members of ELRSS were most devastated by his death as Greg was the founder of the Society and the club actually operates its miniature railway on his property. Greg's passing will not affect the holding of the coming convention, he made this quite clear to the club prior to his death and his family will continue to be actively involved over the coming months.

Evandale Light Railway & Steam Soc.

Location: rear of Falls Park, Evandale

Public Running: Every Sunday

<http://www.evandale-light-rail.org.au>

Hamilton NZ

Bush Inn Railway has been offered to us and accepted. At the moment we have no plans to use it but in the future the engine may be rebuilt to 7.25" gauge. We have all the steel and plant from the railway and will find a use for it.

We have had a bad time with vandals this month. The fences and gates in the station have been demolished and the signal box damaged.

Down at the track two points have been put in and more are in the process of being built. The cross over from 5" track is almost completed and the 7.25" rail put

through the station, which means that we will be able to use both sides of the station on a busy day. The signal box is coming along and the ceiling in the Station is ready to be completed.

Thanks to the Council as we had 20 odd more trees planted which will help our bush outlook.

Hamilton Model Engineers Inc

Location: Minogue Park, Tui Avenue, Forest Lake

Public Running: Every Sunday

<http://mysite.xtra.co.nz/~HME/page1.html>

Maidstone NZ

Construction of trolleys for the ground level track is going well. A prototype 7 1/4" dual axled bogie, assembled and welded up on the jigs was demonstrated at the August meeting. The re-gauging of the club battery electric loco to suit the ground level track is proceeding well. We are using six of the wheels we had turned for our passenger trolleys, re-making the axles, widening the chassis, and rebuilding the body to look the part on 7 1/4".

In this season we are rostering teams to run on the first and third Sunday of each month, with a club running day scheduled in those months in which there is a fifth Sunday. Track operation will start at 11:00 a.m. and continue until 4:00 p.m. We would like to try this roster, hoping it will make things easier for members, and ensure that enough will turn up to run the track easily, and give a good service to our customers. It may be necessary to reconsider the roster as we gain experience.

Maidstone Model Engineering Soc. Inc

Location: Maidstone Park, Upper Hutt

Public Running: Every Sunday afternoon

October-April

Mangere NZ

The second bout of vandalism in as many weeks! The latest was early last week, when vandals destroyed a 21 metre section of the railway track which runs around the edge of Centre Park. Iron rails were pulled up and twisted sideways in the attack, and 54 wooden sleepers were taken from the track and thrown down a nearby drain. Weekends should be a time when members of the Manukau Live Steamers Club drive children around Mangere's Centre Park in miniature steam engines. But their Saturday and Sunday mornings have been filled with a more tedious task — cleaning up after vandals and taggers who rip up the railway track and deface park buildings.

Manukau Live Steamers Inc

Location: Mangere Centre Park, Robertson Road, Mangere

Public Running: Every Sunday

<http://sites.netscape.net/manukaulivesteam>

Millwood SA

The water bore is now fully operational giving significant savings in water costs and provides 85% of our lawn water.

The May field day was a record gate and the canteen was flat out (hot chips were in big demand). The boat pond featured a two-masted yacht operated by prospective member Douglas Wallace.

The Safety Valve Run was a well-attended night run in June. Thirteen locos and about 65 people attended the function from five clubs, SASMEF, AMSRS, Penfield, Morphet Vale and Roseworthy. The night was a cool 16°C., the gates opened at 2 pm and at 6.15 running halted while everyone partook of hot soup, pies, pasties, sausage rolls and pizzas, lots of tea, coffee, and soft drinks. Our reliable signal system provided safe running well into the night as temperatures dropped 9°C with plenty of damp air. The last loco left the track at 12.30 am (Sunday). It was a great night, lots of rolling stock being pulled along, kids having heaps of rides and having fun, a number of guests just standing around and discussing items of "loco" nature.

Carriage shed extension was commenced in February and is now complete. Two sets of points have been manufactured and installed to tracks 5 and 6 and the traverser has been eliminated with multi-gauge points to tracks 1 and 2. With the completion of the carriage shed extension, we gained valuable water catchment areas. This allowed the fitting of a further 700 gallon Poly tank, which brings the total water storage to 5 tanks in all.

South Australian Society of Model & Experimental Engineers

Location: off Millwood Cres, Millwood

Public Running: 1st Sun & 3rd Saturday

Nambour Qld

The Sunshine Coast Railway Modellers' Society have carried out excavation and concreting adjacent to the turntable where-by three additional tracks have been installed in an elevated position in the steaming bay. Water facilities have been extended and additional electricity outlets plus new 12 volt power outlets will be completed shortly. Extensive landscaping including the planting of native shrubs and properly formed walkways throughout the park has been completed. Considerable effort has been made by members to install spark arresters on all locomotives and it is now a requirement that all members' and visitors' locomotives must be fitted with a spark arrester. Some riding trucks have undergone a facelift with cleaning, painting, re-tying and the fitting of new springs and bearings.

Sunshine Coast Railway Modelers Society Inc

Location: Jubilee Park, Florence St

Public Running: 4th Sunday

Newcastle NSW

LMSLS members have really been on the move. In the last few months 17 members and wives visited and ran at Mudgee as part of the Mudgee Wine Festival, 20 members visited Galston for the birthday run on the Saturday with two members



and one loco staying overnight and finally six members attended and ran at Bathurst for the Blowfly Rally.

A well deserved pat on the back to all helpers for the progress so far. With the help of the Work for the Dole people and our own members, the area along the creek is looking great. Anyone who has walked along the creek in the last month would have noticed that there are a lot of native plants in flower. The first Sunday in October saw about 10 members assisting with our planting project — 300 plants to go in — no worries — all done by lunch. This is a good team effort. Over 200 bottle-brush plants will be put in on the first Sunday in November.

Lake Macquarie Live Steam Loco. Soc.

Location: off Velinda Street, Edgeworth
Public Running: Last Sunday (ex. Dec)

New Plymouth NZ

Martin Smyth has been installing lighting and single phase power points and a switchboard and circuit breakers have been donated. There is an ongoing discussion on the subject of how best to shift engines and trolleys from the "shed" to and from the main track without manhandling them. David Smith has painted the traverser and the open steaming bays.

The TSB Community Trust has granted the NPSMEE \$5,000 for the new shed project.

New Plymouth Soc. of Model Engineers

Location: cnr Lizard and Gilbert Sts, New Plymouth

Public Running: Every Sunday

Perth WA

The Club Rooms were broken into recently. No damage to locomotives or rolling stock — just the keys taken. The Father's Day Run as it has always been, was a steady and busy day. The weather forecast was not very promising, as rain had been forecast. The rain managed to stay away, blue skies, with some overcast periods was the order of the day. The queue was quite lengthy at times. A cake stall was held and by all accounts, sold out very quickly.

Castledare Miniature Railways of WA Inc

Location: Castledare Place, Wilson
Public Running: 1st Sunday

Some members of MELSA

Maryborough in action. (Clockwise from top left: Paul Jones gives his Sweet Pea a run at Alan Houston's private track, Des Rowland hauls a load of passengers behind his Hunslet and Bob Kimber tends to the needs of his SMR 10 class tank loco, both at the club track



Petone NZ

It has been surprisingly busy at the Beach. A typical day in September nearly did not get going, as the weather gave the impression of being cool, and few people were about. Alex Gregor and his rostered team finally got #2970 out and by the end of running had about 80 paying customers. As Peter Anderson was hankering to see some steam, Speedy was brought out a bit before 3pm for its first warm-up in six months. This proved to be an extra draw for some, and it was not possible to put it away until shortly before 5pm.

The next Sunday was even better, and over 100 passengers were hauled.

Hutt Valley Model Engineering Soc. Inc

Location: 6 Marine Parade, Petone

Public Running: Every fine Sunday
<http://www.steammachine.com/hvmes>

Warner QLD

Every so often QSMEE does something different. At the end of September our President held an open weekend for the club at his property in the Gold Coast hinterland where he has been extremely busy developing and constructing a 7 1/4" track around the property. The weekend proved popular for club members to run or participate in the running of trains in a relaxed and magical setting. One of our members also ran a radio controlled scale model container ship on the lake besides the station. The property undulates throughout and has a creek running

through it, which when we were there was a trickle but in wet weather rages as a torrent. The weather was a pleasant 22°C, fine with a slight cool breeze. Don't you wish you lived in Queensland. The track starts at a smart station complete with ticket window and has a passing loop. The station was used during our visit as a BBQ area for a sausage sizzle. Leaving the station you curve through a natural vegetation area over a curved trestle bridge around the bottom end of a lake then across an open area past pine trees. Here the line splits to a train unloading ramp area or continues onward, passing a steaming bay before entering into a long tunnel. Exiting the tunnel we arrive at a set of points, which, from the other direction, take you back to the station over another wooden bridge at the other end of the lake. Running past the set of points you then drive onto a high curved brick viaduct over the creek. A structure well worth seeing. Once off the bridge you have a choice, you either curve to the right to proceed to the main station or you select the left branch which takes you up towards the property house. This line is quite steep in places and a test of driving skills when pulling a lot of passengers using scale locomotives. The line winds up the slope and runs along another tree lined creek that borders the property eventually arriving at another station and the end of the line. Here the engine can run around its train as well as turn itself on a self propelled (3 or so able bodied persons)

turntable. A staff system was used to ensure that bottlenecks did not occur. Proceeding down the slope and back onto the main track you reverse run back over the viaduct bridge, take the point at its end and proceed onto the station.

Remember Warner. If you are up our way we would welcome a visit.

Qld Society of Model & Experimental Engineers Inc

Location: 122 Warner Road, Strathpine

Running Day: 2nd Sunday except December, by invitation.

<http://www.steammachine.com/qsmee/>

West Ryde NSW

Rides were slightly up on the previous year, and included a record last August where we gave 3552 rides during the hectic afternoon.

The Society has advanced significantly during the last year. The Hawkesbury Bridge has been repainted and the deck replaced where necessary. Our seats have been entirely upgraded with new treated pine timbers. The elevated track has been progressively receiving an anti-tip rail. This now extends for nearly half the track, on the sharp curves and tight places. The collapsing bank and rubbish collecting area behind the old clubhouse has been cleaned out, the privets removed and a concrete interlocking block retaining wall constructed. The area is in the process of being 'greened' and the access to the ballast pit has been rebuilt.

Considerable amounts of the ground level railway have been re-laid and re-sleepered. This includes the levelling and consolidation of the formation to level and the use of weed mat to prevent ballast contamination. The ground level has also been blessed with two new galvanised cantilevered signal bridges.

The elevated carriage shed traverser is now complete and in place on the rails. Work remains to adjust the approach tracks and carriage shed track heights. A weed-killer car has been commissioned and this has significantly reduced the time taken to perform this ritual. The old clubhouse has been repainted and the toilet has been upgraded and repainted. In the clubhouse new vertical drapes have been provided and a new drinks refrigerator has been purchased. It also has not escaped the marauding paintbrushes, and it is true to say that for some time now, we have never had anything that looks even a little decrepit. Members also now have the use of twin video recorders to view their favourite videos. Historical photos of the Society have been hung and these form a regular reminder of the evolution of the Society.

Craig Hill and Reg Watters invited us to Yarramundi on the 7th July. There were 10 locos and about 30 members present plus a few sons and friends. There was quite a delay at the double to single line junction, usually because of a driverless 50 class on a long string of four wheelers,

slowly making its way up the grade. Inspections were made of Reg's immaculate workmanship on his current projects. This includes such things as quarry flooring and padded seats in his passenger cars.

Sydney Live Steam Locomotive Society

Location: Anthony Road, West Ryde

Public Running: 3rd Saturday (pm)

www.pnc.com.au/~wallison/slsls.htm

Whangarei NZ

We are truly back on track now. On Sunday the 21 October we had our first public running day on the newly extended track, we had the first steam loco perform a run around the newly complete track extension. The live day at the museum was well attended and a big thanks to all the members that turned up to help. We need a station now and the job would be more pleasant. We have had a good look at the trolleys and have found a reason why some of them have been derailing. This is being worked on at present and we should have a better run next time.

We are now concentrating on the plans for the Station and Clubhouse; hopefully

we may be able to have them approved by the club soon.

Whangarei Model Engineering Club

Location: Heritage Park, Hwy 14, Maunu

Public Running:

(Congratulations to all in Whangarei on getting the club up and running again. Well done! ... Ed.)

Farewell

We say goodbye and thank you to these model engineers who have passed on:

Ron Alloway (Bathurst MRCS)

Bill Chant (Canterbury SME)

Arch Eastham (Lake Macquarie LSLS)

Phil Isaac (Maldstone MES)

Marjory Kingston (Diamond Valley R)

Lou Marquet (Canterbury SME)

Bill Olsen (Hutt Valley MES)

Dick Phillips (Queensland SMEE)

Jack Rutledge (Diamond Valley R)

Greg Waddle (Evandale LRSS)

and extend our condolences and best wishes to the family and friends they leave behind.

Coming Events

10 to 14 January

Modex 2002 — Palmerston North, NZ

The Palmerston North Model Engineering Club is hosting MODEX 2002, the NZ International Convention and Exhibition. More details on this exciting event will be published in later issues. Contact address is MODEX 2002 Registrations, 12a Hereford St, Palmerston North, New Zealand. Ph. 64-6-355-7000, Fax 64-6-355-7008 or email pnmecc@clear.net.nz

16 February

All Comers' Day — Box Hill Vic

Members of the Box Hill Miniature Steam Railway Soc. invite all comers to this great event at the club track at Elgar Park, Elgar & Belmore Roads, Box Hill. BBQ lunch and afternoon tea supplied as well as lots of good old fashioned hospitality. Don't forget your boiler certificate.

23 February

49th Birthday Run — Edgeworth NSW

Members of Lake Macquarie Live Steam Locomotive Society invite you to help us celebrate our 49th Birthday. Sunday afternoon is our normal public running. Visitors are not obliged to haul passengers. We have 3 1/2" & 5" elevated, 5" and 7 1/4" ground level tracks. Full camping facilities. Refreshments available. To help us cater properly could you advise us if you are attending. All are welcome with or without models. For additional details, if needed, contact our Secretary Joe Huntley on (02) 4954 0358.

28 March to 1 April

AALS 46th Convention — Evandale Tas

The Evandale Light Railway and Steam Society will be hosting the next AALS convention at Evandale 15 km south of Launceston in Tasmania from Thursday 28th March 2002 — Monday 1st April

2002. Ground level 7 1/4" and 5" combined, separate 5" ground level and 3 1/2" and 5" combined raised track, all with separate steaming bays and loading ramps. Book early if coming by boat! Spaces fill up early at Easter time! Details page 42, AME #98. Latest information may be found at <http://www.evandale-light-rail.org.au> Coordinator is Peter Lawson, 6 Monica Place Perth Tas 7300 (03) 63981676 Email dmlawson@optusnet.com.au

2 to 7 April

Post-Convention Run - Ulverstone Tas

The North west Model Engineering Soc will be making their track at Ulverstone available for convention visitors to run on from the day after the Convention until their normal running day on the following Sunday. Further arrangements can be made at the Convention. Club Sec. is Miles Ponsonby (03) 6425 3675

20 April

All-Comers' Day — Hastings Vic

The members of BHP Western Port RS invite all interested clubs to attend this exciting event at the club track in the BHP Western Port Recreation Centre, Denham Rd, Hastings. For further information contact Secretary Marg Hayward on (03) 9766 4735.

30 April to 12 May

North Queensland Safari — various

Once again it's time to come and enjoy a couple of weeks in the sun. Run on 5 tracks starting with Maryborough on 30 April, then to Rockhampton, Mackay, Townsville and finishing at Pinnacle Village, Wonga Beach on May 12. Run will include annual Mackay Run on Old Labour Weekend (May 4-5). Townsville is the only venue with 7 1/4" gauge. Contact Len Heaton on (07) 4959 2169

News From The Wild West

Model makers help raise funds for bowling club

From occasional correspondent, Jonathan Milne-Fowler

Saturday 1st September 2001 was fine and sunny for a display of models mounted at the Comet Bay Bowling Club in Singleton, Western Australia. The display was organised by Cee Bay Modellers, an informal group of model engineers, radio controlled model aircraft enthusiasts and model boat club members, mostly living in the cities of Rockingham and Mandurah south of Perth.

The display, which was open from 11 am to 4 pm on the day, was publicised by the local community newspapers and a steady stream of visitors kept the participants busy the whole day. Entry

charge was a "gold coin" donation and at the final count in excess of \$780.00 had been added to the bowling club's building fund. Everybody appeared to enjoy their visit and no complaints were received about any aspect of the function.

Upon arrival at the club house the first thing visitors saw was a line up of radio controlled model aircraft. **Photo 1** was taken before all the models had arrived but gives some idea of the quality. **Photo 2** is a closer view of the model Tiger Moth finished in the colours of the Free French Airforce during World War 2.

Inside the clubroom the display was set out around the walls



Photo 1



Photo 2



Photo 3

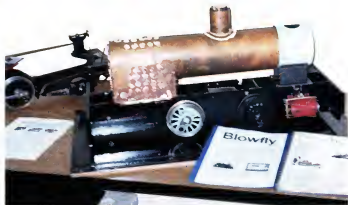


Photo 4



Photo 5

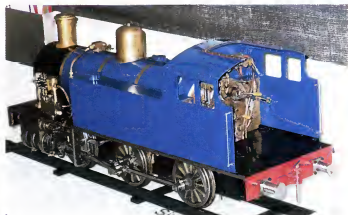


Photo 6



Photo 7

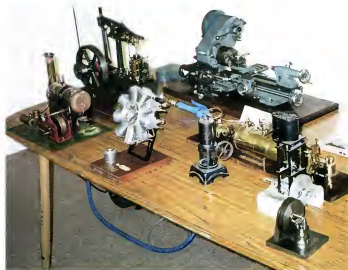


Photo 8

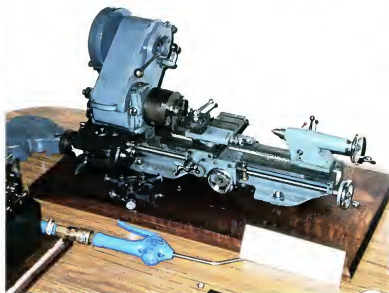


Photo 9

and in the middle of the room on tables and trestles. **Photo 3** gives some idea of the lay out. The three sailing models are members of the One Metre competition class, which regularly compete on one of the lakes within the Singleton area.

David Brown of Safety Bay is building the five inch gauge *Bloufly* shown in **Photo 4**. After the photo was taken the wooden patterns used for the castings were added to the display.

In **Photo 5** can be seen the Gauge O layout built by Mike Rogers and his wife Trish representing the slate quarry village of *Much Puddling on Wye*. The narrow gauge locos on display are battery powered and were kept busy most of the day shunting the slate wagons up and down the length of the track.

Ken Dines displayed his nicely finished Super Simplex which is seen in **Photo 6**. On the left hand side near the smoke box can be seen a "Duplex" feed pump built to the words and music of LBSC. Ken Dines also exhibited his nearly completed 40 cc five cylinder radial aircraft engine built to a design published by the American magazine *Strictly I.C.* the engine utilises glow plug ignition which slightly simplifies construction as it eliminates timing gears and

magnetos. Ken started from scratch with the gears to operate the valves, making his own 48DP hob and using the free hobbing method to produce involute gears. The engine is shown in **Photo 7** which also shows a single cylinder engine having the same cylinder dimensions as the radial, built as a trial run to establish that the home made gears would be satisfactory.

Les Lidbury came all the way from Bayswater on the other side of the metropolitan area to display a range of interesting models and also some of his range of engineers' small tools which he imports for sale to industry and hobbyists. Of course the piece de resistance was the half size model of a Myford lathe complete with an array of accessories, including the Myford indexing and dividing attachment. The various model steam engines in the display were run intermittently on compressed air supplied by a small portable compressor which is mostly hidden in **Photo 8**. **Photo 9** is a closer view of the model Myford.

Modesty precludes me from enumerating the items which I contributed to the display but I cannot resist including a photo of my one inch scale model traction engine being constructed to represent a simplified version of the Savage *LITTLE SAMSON* design of 1905. It is visible in the general view photo but is dwarfed by the model boats. **Photo 10** was obviously taken outdoors but gives a reasonable indication of the current state of progress.

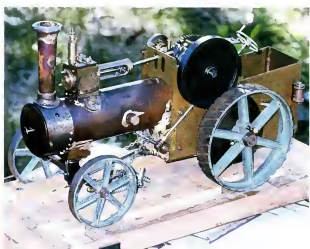


Photo 10

Letter Box



Congratulations on 100

Sir,
I am writing to congratulate you on reaching the 100th issue. I have always supported the magazine as much as I can. Some of you know doubt have seen some of the articles I have written. Hopefully like the magazine, there are many more to come.

The magazine success is based firstly on the hard work and dedication put in by those that publish it. Many of these people I have met on the phone rather than in person, but each one is always friendly and helpful.

Secondly the magazine covers a broad range of hobby activities, which increases the readership and hence increase its chances of being read. I find this very refreshing; there are some very talented people out there.

Also it brings members of the hobby closer as communication is easier which enables us to be more aware of what is going on. Long may this continue.

Best wishes for the future.

Steve Reeves

Western Australia

Garratt chassis design

Sir,
Something that may not have been observed by interested people is that traditionally, the majority of Garratts have been built with the wheel arrangement of rigid frame style chassis. In my opinion this is not what the articulated Garratt format is about. The Garratt design was fundamentally intended to be bi-directional, with one chassis running in reverse at any time, so two purpose designed chassis with symmetrical wheel arrangements are what should have been provided.

A symmetrical wheel arrangement means equally spaced bogies or trucks, or no bogies or trucks, at each end of each chassis. Such a symmetrical wheelbase would ensure the balanced optimization, of stability, and of tracking, of the entire locomotive. Many millions of happy tonne kilometres have been run with Garratts, as are, however there were many instances of the flanges of the wheels of the trailing chassis, both carrying and driven, wearing out at a significantly greater rate than the flanges of the wheels of the leading chassis. So, in my opinion symmetrical wheel arrangements might have cured this problem.

There were 1651 Garratts built and 1538 of these were assembled for commercial use, world-wide. Of these, the only Garratts that appear to have been designed with a purpose designed chassis with symmetrical wheel arrangements are the total adhesion examples, (30) 0-4-0+0-4-0 and (37) 0-6-0+0-6-0. Other Garratts designed with something like a purpose designed chassis with symmetrical wheel arrangements were the double bogie, (84) 4-6-4+4-6-4 and (73) 4-8-4+4-8-4. The wheel arrangements were actually asymmetrical as the trailing bogies on each chassis were carrying bogies and not leading bogie designs.

The combined total of all adhesion Garratts and all double bogied Garratts represents only 14.56% of the entire number of Garratts built!

It might be an opportune project for live steam modelers to see if there is any discernible change in the stability and tracking of a live steam model railway Garratt if a leading bogie or a leading single axle truck is placed equidistant from the nearest driven axle at each end of each chassis.

James Tennant

Australian Capital Territory

Soft balls

Sir,
I've heard some model engineers talk about non-metallic soft balls used in clack valves which give superior performance compared to metallic balls.

These 'soft' balls are used in automobile automatic transmissions I'm told and come in white, brown and black. Presumably Teflon, Bakelite and rubber?

Can anyone fill us in on the best type to use, any changes to the clack or seat required, the characteristics of the balls and the best place to get them. It seems some float in water which is a problem in traditional clack valves in some locations.

Steve Malone

Queensland

Thanks and boiler lagging

Sir,
On behalf of the organizing duo at Mannum, I wish to express our sincere thanks to all those delegates who made the often very long journey to attend the 13th Miniature Traction Engine and Steam Road Vehicle Rally.

The comments about doing a good job are gratefully accepted, but without the delegates we would have no rally, again many thanks all.

At the informal BBQ on the Friday evening several people wanted to know what material I use for the internal and external lagging (thermal) on my boilers, both fire tube and water tube types. It is Superwool 607 MAX, manufactured by Thermal Ceramics Australia Pty Ltd, Burke Road, Alexandria NSW 2015 and is available through their agents Pyrotek-

NSW: 147 Magowar Road, Girraween

2145. Ph. (02) 9631 1333

VIC: 26 Nicole Way, Dandenong

3175. Ph. (03) 9706 9077

SA: Unit 5/3 Selgar Ave, Clovelly

Park 5042. Ph. (08) 8277 7333

This material is a blanket, easily cut to shape, is neutral or non corrosive to steel when in contact with water, etc., etc. Full safety data sheets are freely available upon request from agents. (Hope that stops the phone calls). Kindest regards to all.

John and June Levers

South Australia

(Disclaimer: I have no financial or other interests in the companies mentioned. There are many similar materials available, this one works for my hobby projects.)

Australian Standard Garratts

Sir,
In response to the notes at pp 25-27 of AME Issue 99 from Melanie Dennis about my letter concerning the ASG and my ASG construction data table, both, at p 61 of AME Issue 97, there are some things I would like to comment about.

It is good and timely that some reasonably accurate data concerning the ASG is finally being made visible to the public. This can only interest people in, and attract people to, this local prototype design.

At p 32 of AME Issue 88 there are listed the ASG live steam models in consideration or being built at that time. There are more examples than Melanie noted and not all examples are likely to have been included in this list.

If the ASG had been persisted with I

Letterbox Contributions

You are welcome to send letters by mail to:

PO Box 21, Higgins, ACT, 2615 or

fax to: (02) 6254 1641 or

e-mail to: amemag@bigpond.com

As far as possible, AME is an open forum for all members of our hobby. Therefore, all expressions of fact or opinion as long as they are not libellous will be considered for publication.

Please type or clearly print your letters, as script is often difficult to interpret. Better still, send them in on disk or by email.

am sure the three ASG designs would have evolved into both, 4-6-4+4-6-4 for passenger trains, and 4-8-4+4-8-4 for freight trains, wheel arrangements. The 4-8-2 wheel arrangement was not, and is not, an ideal type to use with the Garratt format. It is merely a rigid frame wheel arrangement arbitrarily used in an articulated format. This would have become obvious through time, through tracking instability and uneven wear between the two chassis, by the people utilizing the ASG.

People should note that my ASG construction data table above contains one typo. The construction numbers of G6-G9 should be Newport c/ns 571F-571J and not as shown.

Also, several typos turned up in my list of Surviving Australasian Garratts at p 63 of *AME* Issue 98. The APC CLTB G Class is a 4-8-2+2-8-4, the SAR GMAM Class are 4-8-2+2-8-4, the NZR 15th Class is a 4-6-4+4-6-4, the second surviving SA 400 Class is no 409. Also, two other SAR GMAMs can be added to the list for completeness. These are the 1067 mm gauge 1. SAR GMAM 4090 BP c/n 7757 1956 4-8-2+2-8-4, and 2. SAR GMAM 4129 BP c/n 7844 1958 4-8-2+2-8-4, which are or were intended to be purchased by the Hotham Valley Railway in Western Australia.

Finally, I will repeat my push for an annual Australasian Garratt prototype live steam rally somewhere, sometime.

Interested people can pick a prototype from my Australasian Garratt construction table at p 46 of *AME* Issue 96. I am sure a parochial rally such as this will become extremely popular through time and it would be interesting to see if all classes are represented.

James Tennant
Australian Capital Territory

(I believe the subject of data relating to Australasian Standard Garratts has been thoroughly thrashed out in recent months and unless something which is dramatically new comes to light, I propose to treat it as a closed subject. ... Ed.)



CUTTING SLOTS

There are three ways to cut long slots with closed ends in steel bars — oxy-cut them, mill them out or bandsaw them. Oxy leaves a rough and inaccurate surface which is inaccessible for grinding although it can be finished by filing. Filing is slow, hard work so what about milling? Unfortunately that is particularly rough on the cutters unless they are carbide. Milling does the neatest job but is certainly not the fastest and that is because it is intrinsically "inefficient". The cutters have to remove ALL the metal in the slot, chip by chip. They soon get blunt in this sort of work and sharpening them is outside the scope of most model engineers.

Bandsawing is intrinsically more efficient because only the thickness of the saw blade has to be removed on the two sides of the slot.

The problem with bandsawing however is that either you (1) have to break the blade to enter the closed hole, then re-weld the blade - again outside the scope of the average shop, or (2) you have to make an entrance cut from one end of the bar to get into the slot.

That last is certainly the best method, but suppose the slot is $\frac{3}{8}$ " wide and the bandsaw blade is $\frac{1}{2}$ " wide, you cannot turn it around at the other end to cut the second side. Do you have to make second entrance cut? The answer is No!

So how does one saw the other side of a slot that is narrower than the blade-width, with only one entrance cut? Mark out the slot on the workpiece making it the full width if not intending to finish it by milling or filing, otherwise mark it out slightly undersize.

(a) Drill holes at each end to define the slot, as already stated, and make an entrance cut to the side of the first hole - the one that is closest to the end of the bar. Drill a 'second hole' close to the first one, within the slot. Saw down the full length of the side of the slot that is in line with the entrance cut.

(b) Take the saw back to the first hole and start sawing down the slot again but this time turning the cut as much as possible until you get to the other side of the slot, which you should be able to reach in perhaps an inch or so. That 'second hole' is used to help turn the blade. Finish cutting down this side of the slot to the far hole.

(c) A large piece tapering from nothing to the width of the slot - can now be removed.

(d) Completely withdraw the workpiece from the saw.

(e) Turn it around and insert the BACK of the saw into the entrance cut.

(f) Voilà! You can now go to the far end and cut back towards the first hole to clean out the bit that was left behind the first time.

(g) To close the entrance cut first cut a thin strip of 1-1.2mm steel to pack the gap. Then run the angle grinder fitted with a cutting blade along all accessible edges to make a groove 2 to 3mm deep. Fill the groove with weld. Smooth it back flush with the angle grinder.

(h) If a smooth finish is required in the slot, it can be milled. That requires the removal of only a tiny amount of metal now so this time it is a much more efficient process and there is minimal wear and tear on the cutter.

News Desk



with David Proctor

Welcome to issue 100! Many readers have experienced delays by *Australia Post* in delivering their magazines over the last three issues. There have been instances where magazines have been delivered over a month after posting, sometimes not at all, and in some cases magazines have been returned to us undelivered, where in every case we have been able to verify that they have been correctly addressed. I do not know what has gone wrong with the postal system but I do know the problem seems to be getting worse and there is no pattern, the locations seem to be anywhere at random. This particularly leaves me unimpressed when *Australia Post* saw fit to increase bulk postage charges on November 1. I am not aware of any problem with the overseas deliveries. As *Australia Post* are not interested in any complaints unless we can give them specific information, I would appreciate it if from now on anyone who receives their magazine unacceptably late could let me know. To assist in this regard the following are the dates on which each issue will be mailed over the next 12 months:

Issue #100 — December 17	#101 — Feb 21
#102 — April 24	#103 — June 24
#104 — August 23	#105 — October 24
#106 — December 17	

In my opinion there is no reason why they should not be in your hands in under a week.

Cover price

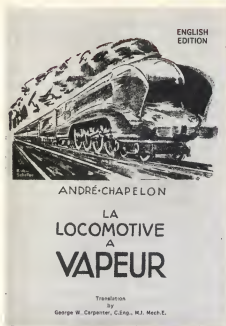
In the last issue I advised that we were having to increase the subscription price as a result of the abovementioned charge increase by *Australia Post*. This charge increase has also had an effect on our production costs and delivery costs for the newsgate network and consequently the cover price in *Australia* has also had to increase from \$6.15 to \$6.50. We have managed to keep this increase down to 35 cents but unfortunately not the New Zealand cover price which bears the full impact of the postage charges.

Readers help

We have one reader seeking plans for a 2" to 2½" scale sit-in diesel loco for 7¼" gauge, either hydraulic or electric drive. If you can assist him could you please contact the *AME* office.

Bob Field was browsing a website for amplifier designs and found this link. It contains good photos of some unusual locos, primarily the Self Site (Doug Self is an amplifier guru) www.dself.demon.co.uk/ Click the link to Museum of Retro Technology.

Product Reviews



La Locomotive à Vapeur (The Steam Locomotive)

By André Chapelon

English translation by George W. Carpenter

André Chapelon... who is this guy? It occurred to me while writing this review that some readers may not be aware of the significance of André Chapelon (1892 - 1978) to steam locomotives. Let me tell you a little about the man who is a legend of steam locomotive design. André Chapelon was the chief of the locomotive design division of the SCNF (the French National Railway) and designed some of the world's most advanced steam locomotives. André Chapelon brought compounding to a fine art form for its time.

A Chapelon précis

I suppose you could say that the steam locomotive reached a couple of highpoints: In the United States, locomotives became very powerful, very large, and reached a high level of durability and mechanical stability with the introduction of the Timken bearings etc. In France, André Chapelon's locomotives reached the highest ratings for power-to-weight ratios, fuel economy and thermal efficiency. Unfortunately, the two development streams rarely met. Sure there were developments in other countries, but steam locomotive developments in France and

the United States between the 1930s and 1960s provided the greatest performance enhancement in steam locomotive design. Chapelon achieved his results initially through the systematic rebuilding of existing steam locomotives.

Most locomotives designed up to his time had been devised through trial-and-error methods. Chapelon carefully analyzed certain areas of the locomotive with inherent losses and applied sound engineering practice to discover improvements to minimise these losses. Chapelon realised that all parts of the locomotive were important, and paid particular attention to exhaust system design, he is responsible for the Kylchap exhaust system. By optimizing those areas of his locomotives that were deficient, he greatly improved their performance. His compound locomotives achieved the record thermal efficiency for conventional steam locomotives (more than 12%) and achieved power-to-weight ratios not equaled anywhere else.

La Locomotive à Vapeur provides the reader with an insight into the design mind of André Chapelon with many pages of design clues, drawings and photos that he was pleased to share with the world. It is ironic that we start the 21st Century with a work of this calibre... steam is not dead!

The book

George Carpenter, ably carried out the only English translation of the second edition of *La Locomotive à Vapeur* published in 1952. Mr. Carpenter knew André Chapelon and was also active in steam locomotive development projects and existing locomotive improvements since 1960. Many hands were involved in producing the final book, but it was Adam Harris of Camden Miniature Steam Services that brought it all together. Up until now this book has only been available in French. Several addenda have been added to bring the English version up-to-date. It includes details of a Chapelon design that was never built. There is also a colour section that covers both Chapelon and recent steam developments.

The more I read this book, the more I realised that I will have a problem with describing the contents in a review. There is so much detail that the best I can do in the limited space is to provide a general description of the sections.

The introductory part of the book contains several prefaces from previous editions that are instructive in themselves.

Part A covers the evolution of types in Europe and America from 1907 to 1947; Steam Utilisation; Steam Generation; Driving Mechanism; The Locomotive as a Vehicle Frame Structure; Ancillary Equipment; Boosters; Tenders; Braking; Developments of Draughting Systems etc.; Progress in Simple Expansion Locomotive Construction; Compound and Simple Expansion Locomotives Compared; High Speed Locomotives and Progress in Locomotive Utilisation. Part A is where this book excels as a unique resource for model engineers to discover what the steam locomotive really is and how it should be built, it's not just a catalogue of parts.

Part B is a Survey of the Principle Locomotive Types and covers just about every type of locomotive, too numerous to list, in a very descriptive manner.

The Addendum contains a chapter of New Programmes for Locomotive Construction and the Index to the original book.

There is a section on Additional Material for the English edition only. This section has headings such as Changes to the European Railways during the 20th Century; The case for Compound Expansion; Emile-Andre Schefer; André Chapelon's High Powered Locomotive Designs; Chapelon - the South American Connection; Steam Locomotive Development in the late 20th Century; The Steam Locomotive — a Future? The Gas Producer Combustion System, and a Bibliography.

Present day Chapelon followers

There is an impressive list of locomotive engineers following in the footsteps of André Chapelon. Some names may be familiar. There is a biography of each person plus color photos of their projects. Names such as Livio Dante Porta with projects in the US, South America and Cuba. David Wardale of *Red Devil* fame with projects in South Africa and US. Phil Girdlestone with projects at Festiniog, Sudan, Alfred County (South Africa), and our own West Coast Railway in Victoria with R class modifications. Shaun McMahon of the FCAF. Nigel Day with projects in Wales. Roger Waller of the Swiss Locomotive Works (SLM) and projects in South Africa with David Wardale.



Model engineering

One of the main reasons I hear from people who are interested in model live steam locomotives but are apprehensive at having a go is that they don't have the skills. The skills they seem to mean are not necessarily the actual making of the parts, but the knowledge of what the parts are for and how they fit into the general scheme. From a model engineering point of view we have few publications that get to the nitty-gritty of full-size locomotive design. I have several books on steam locomotives, but *La Locomotive a Vapeur* has the meat to fill in the blanks on the workings of the steam locomotive.

I was fortunate to come across some of André Chapelon's work when I first began model engineering. I knew very little of steam locomotives apart from those running on my HO and N gauge layouts. His theories interested me and I began to discover more of his work. For my first locomotive project, a 5" gauge 0-4-0 Decauville, I decided to adopt a combination of André Chapelon design for the running gear, with Sam Ell of Swindon (UK) fame (via Bob Sanderson's modifications) for the smokebox design. It is only a small narrow gauge locomotive so I needed all the performance enhancement features I could find! The construction of the model was less painful with André Chapelon looking over my shoulder so-to-speak.

The end result was a so-far locomotive for its size and it still confounds people how it can haul so much. It would be interesting to put it through an efficiency trial, but we don't seem to have them any more here in Oz. The main ingredient was from André Chapelon's design theories and my current locomotive project will feature all of the Chapelon ideas, including the smokebox. It is a 5" gauge narrow gauge Baldwin 2-6-2, so hopefully the two design streams I mentioned earlier will come together in model form. So now those who know my locomotive know my secret! Should I tell you what I did? Unfortunately there is not enough room in this review and the parameters will vary for your own application. *La Locomotive a Vapeur* will give you all the clues you will need and many more besides, because it contains the complete works rather than a few snippets that I came across in the beginning.

Locomotive preservation

This edition of *La Locomotive a Vapeur* will be of benefit to all railway historical societies and individuals operating full-size steam locomotives. With the costs of running the preserved locomotives continually rising, anything that can enhance efficiency without compromising the historical aspects of the locomotive would surely be of long-term benefit. As steam designers and steam fitters fewer in number, publications such as this are vital to continue the knowledge of former times.

Technical details

La Locomotive a Vapeur is a large

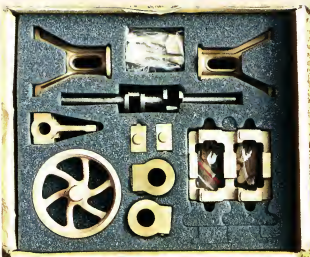
book. A4 size with 659 pages over 450 black and white photos, drawings, diagrams and charts. 41 colour illustrations and six fold out pages of drawings. This hard cover book is presented on high quality paper. With the current exchange rates the price in Australia and New Zealand will seem excessive and that is unfortunate and the situation is unlikely to change in the near future. However, if you are serious about your model engineering or preservation project this is a serious book that has the ability to repay you many times over with its wealth of information.

Price: £68.85 (includes postage to Australia)

Available from: Camden Miniature Steam Services, Barrow Farm, Rode, Frome, BA11 6UB U.K. Phone (from Australia) 0011 441 373 83051. Fax (from Australia) 0011 441 373 830516.

website: www.camdenmin.co.uk

email: orders@camdenmin.demon.co.uk



Brian Carter



Stationary Steam Engine Castings

By Miniature Steam Pty. Ltd.

This review only covers the casting set and documentation as supplied. Over the years I have built a few stationary engines because they are an historical feature of the art of model engineering and their place is firmly fixed in the preservation of industrial processes as a reminder of the times before electric motors. I would

encourage anyone considering a first-time locomotive or traction engine style project to have a go at a stationary engine first. The reason is that they are usually quick to make and contain all the elements of the locomotive/traction engine running gear. The thrill of running the stationary engine for the first and subsequent times is a great incentive to give us that nudge we so often need to persevere with long-term projects like locomotives or traction engines.

You could build a stationary model like these and put them to work powering your steam launch or other marine model. Or just start a collection of stationary engines; there are many types available to enhance your display.

Getting back to the story... I have the *Mildura* twin cylinder vertical model with Stephenson's reversing gear $\frac{3}{4}$ " bore and $\frac{3}{4}$ " stroke. The kit comes supplied with all castings in lost wax cast bronze and a cast crankshaft in SG iron. The packaging was not what I am used to, each part lives in a specially cut-out foam insert in a sturdy cardboard box. Small parts are in plastic packets to keep them together. The presentation and packaging is first class, they have gone to great lengths to ensure the contents arrive in excellent condition. There are several engines types in their range and I am assured that each product is presented in the same fashion.

The castings have the best finish of any castings I have ever seen for an engine of this type. Most manufacturers still rely on sand castings, but the lost wax process is ideal for these smaller engines. The only machined surfaces required are on the mounting, operating and mating parts; exterior surfaces need no work at all. The crankshaft for *Mildura* requires little machining to bring to the finished size. An excellent product for the beginner to experience the sensation of steam power.

See the ad on page 4 for a photo of a finished *Mildura* kit.

Price: *Mildura* as reviewed \$404 (Engines in range start at \$185) incl. GST.

Available from: Miniature Steam Pty. Ltd. PO Box 840, Mulgrave, Victoria, 3170.

Brian Carter

2002 Entry Form

Name Age

Address

..... Phone

Club or Society (if applicable)

Qualifications and/or occupation

Brief description of entry

Approx. dimensions & weight (Enclose photo if possible)

Equipment used in construction (e.g. lathe, drill press, hand tools, etc.)

Other information relating to the entry (eg. outline of construction and assistance had, if any).....

Australian Model Engineering undertakes that the privacy of entrants will be respected.

I hereby declare that:

1. I have personally constructed at least 75% of my entry.
2. I was under 25 years of age as at 31st December 2000.
3. I agree to the conditions of entry and that the judges decision will be final.
4. I agree to display the entry at the 2002 AALS Convention site for the purposes of judging.

Signature Date

The AME Under 25s Encouragement Award

Conditions of Entry

Younger model engineers are making great contribution to the hobby, even though they are often hampered by having less access to tools and resources than older model engineers. AME instigated this award in 1993 to encourage under 25s to show their talents; to engender a spirit of encouragement in more experienced model engineers; and in a small way to foster the growth of participation by people in the younger age range.

it is pleasing to hear that a number of under-25s have been spurred on to complete their models by the thought of participating in the award.

If you fit the age criteria, photocopy the entry form on the next page, post or fax it to AME and start a-fittin' and a-turnin'!

Age criteria

If you turn 25 in the 2001 calendar year or later, you are eligible. If you turned 25 in the 2000 calendar year or earlier you are not eligible.

Entries

May be any model or experimental engineering item or model. For example it can be a steam, diesel or electric outline locomotive; steam, internal combustion, electric, hot air and Stirling cycle, stationary or mobile plant or road vehicles; boats or ships with any form of power drive; marine plant;

workshop equipment, jigs, fixtures and aids to manufacture; clocks and other horological or astronomical items; electronic, programmable logic, digital and analogue controls and monitoring of any of the above models — or any other item(s) which the judges consider relevant to model engineering.

Judging

The following criteria are taken into consideration:

- The age of the entrant and skills relevant to age.
- The ambitiousness of the project.
- The workmanship of the project.
- The access to workshop facilities.
- The location to resources & materials.
- The formal skills of the entrant.

These criteria are intended to even out the playing field so that the judges may look at each entry "all things considered." The idea is that the thirteen year old student (with no formal mechanical skills) from the Back'O'Bourke who works in a tin shed with pistol drill, hacksaw, file and hand scraper to build a model of a ferris wheel has as much chance as the 25-year-old qualified thou-splitting toolmaker with a CNC workshop and limitless resources who has turned out a VR H class 4-8-4 with

working stoker engine!

Have a go!

The presentation will take place at the AALS convention at Evandale in Tasmania this coming Easter. Entries will be received up to day one of the convention. The perpetual trophy will be awarded to the winner at the AALS awards presentation night on Sunday evening along with a prize (to keep) relevant to the winner's interest in the hobby. All entrants will receive a one year complimentary subscription to *Australian Model Engineering* magazine.

So come on all you younger model engineers, let's see the tables with plenty of entries on them in Eyandale this Easter!

Deadlines for 2002

Many readers ask when items need to be in for each issue. The following list is the latest dates which items will be accepted:

Issue	Club Roundup	Classified Ads
Mar/Apr	January 11	January 25
May/June	March 8	March 22
Jul/Aug	May 13	May 24
Sep/Oct	July 12	July 26
Nov/Dec	September 13	September 27
2003		
Jan/Feb	November 8	November 20



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Wanted — back issues of Model Engineers Workshop

- Would like to buy or trade to obtain copies of #12, #13, #15 & #22 also interested in any other M.E.W. you may have surplus to requirements please contact for list of extra copies willing to trade for the above contact Shane (H) (08) 98531134 P.O. Box 5567 Albany 6332. email: caudwell@denmarkwa.net.au

Wanted — 2" scale traction engine

- British manufacture, complete running to all codes, phone John on (03) 5349 2498.

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- All with Briggs type boilers. Diesel chassis 7 1/4 or 5 inch, a number of 4" and 4 1/2" spoke wheels, Drawings, all must go, and reasonable price. Kits from \$600, English and American. Contact Ray Catts on (02) 6922 3540 email: rcatts1@telstra.easymail.com.au

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Home Shop Machinist - 1997 (Stirling-powered Tractor construction parts 2 to 6). Bob Giles (08) 9844 4133 or rgiles@linet.net.au

HELP

Advice re building or buying **cutter grinder**. Harry, 1 Excelsior St. Manangatang Vic 3546 (03) 5035 1459

Copy please of ME pages 408 (2 Oct 1992, part I) and 647 (4 June 1993, part IX). (03) 9846 6197 Colin. Will cover costs.

Any information (or manual) on **Mars junior lathe** made in Brisbane by Mars Machine Tool Mfg Co.). Would cover costs. F Davies c/-AME office.

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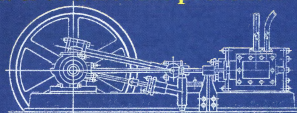
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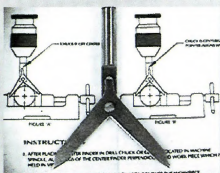
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